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Government Cooperates in Research

Review of Work of Bureau of Standards in Metallurgical Investigations—Joint Efforts with Industry and Other Agencies

BY DR. H. W. GILLETT[1]

THE work of the metallurgical division of the Bureau of Standards is almost wholly research, conducted on a cooperative basis. A study of the records for the past fiscal year shows that only 20 per cent of the total funds spent by the division (a little over $100,000, without Bureau overhead, which would bring the sum to around $125,000), was applied to work other than research in metallurgy. Even this 20 per cent was spent for cooperative purposes and partly for research, since it covers testing and service for other Government departments as well as for the research work of other divisions of the Bureau.

It also covers the cost of answering the many inquiries for metallurgical information brought to the Bureau by letters and by personal visits. To answer these inquiries with the most recent metallurgical information available from other sources as well as from the Bureau's own work, 2500 articles of metallurgical interest in American and foreign journals, and 1000 patents, were indexed and added to the previous stock of "findable information."

Mimeographed letter circulars, such as one on the corrosion resistance of iron and steel products, and one assembling the evidence to show that metals do not "crystallize" under repeated stress, are prepared to answer recurring inquiries.

About 80 per cent of the funds were devoted to true metallurgical research. "Courtesy" tests for the public, done without fee, because the information obtained bore directly on the research work of the Bureau, amounted to 1½ per cent. No routine tests not bearing on research problems, except those made for the Government itself, have been made in the last fiscal year. A letter circular has been prepared giving the addresses of commercial laboratories equipped for metallurgical work and requests for routine tests are referred to them.

Research work, taken up at the instance of other Government departments, accounted for 19½ per cent. About a third of this expense was covered by funds transferred from those departments and included in the total referred to above. Cooperative work with national technical societies, such as the American Society for Testing Materials, American Society of Mechanical Engineers, American Foundrymen's Association, American Ceramic Society, American Welding Society, etc., took 22 per cent of the funds.

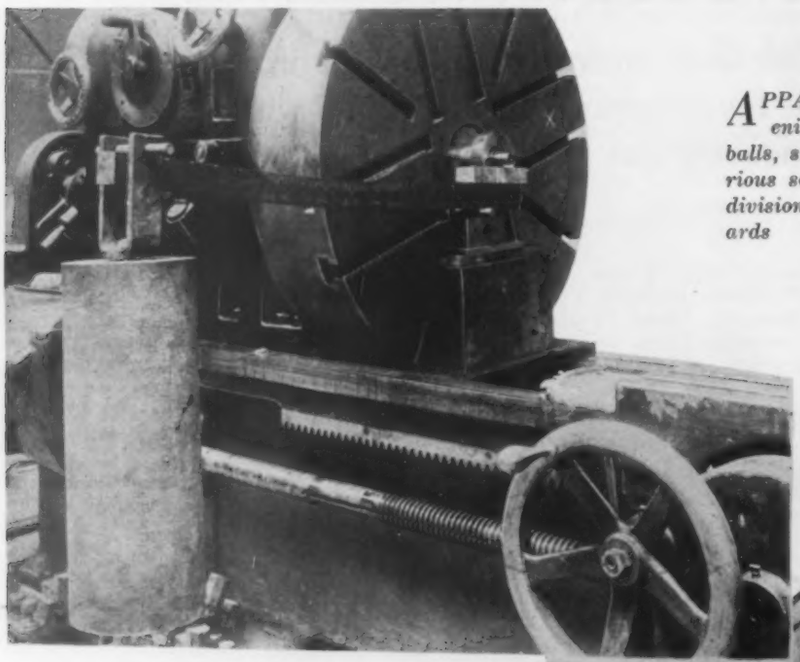
A few research associates and fellows,

EXTENSOMETER, reading to four millionths of an inch, specially constructed for testing metals at high temperature, in use on cooperative work

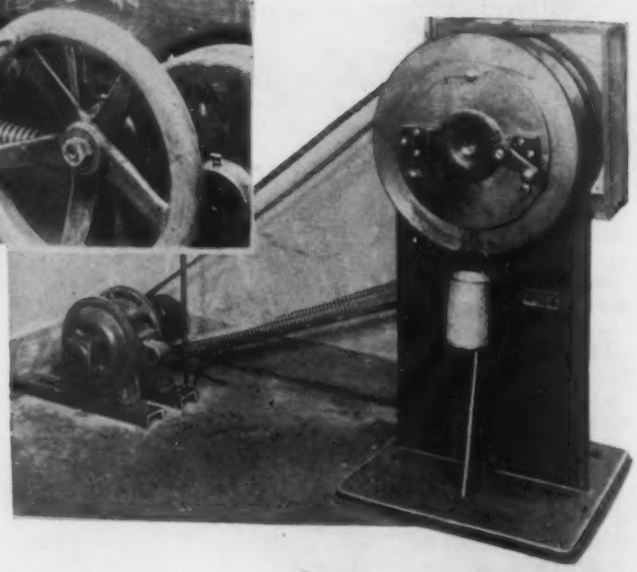
[1] Chief division of metallurgy, United States Bureau of Standards. This paper is published by permission of the director of the Bureau.

supported by the metallurgical industries or from Swedish educational institutions, have worked in the metallurgical division during the past year. Supervision of and cooperation with these men accounts for 3 per cent. This type of cooperation, in which industry bears part of the cost of a new project, should increase, since the economy program of the Government precludes larger appropriation of public funds. The metallurgical industries have not, so far, utilized the research associate plan to the extent that the ceramic, cement, textile and other industries dealing with non-metallics have done. In all there are 75 such associates at the Bureau.[2]

The remaining 32 per cent of the funds was devoted to research projects taken up at the initiative of the division, but generally studied in cooperation with others. This distribution of costs is quite similar to that reported[3] for the previous fiscal year in articles which describe the general work of the division more fully than is possible in the space allotted here.



APPARATUS used in work-hardening a new alloy for Brinell balls, studied cooperatively by various sections of the metallurgical division of the Bureau of Standards



SWAGING machine (at right) installed for cooperative research at the Bureau on metals of the platinum group

About 60 metallurgical publications were made by the Bureau in the past year, the titles including a wide range of subjects. These appeared in the scientific or technologic series of Bureau publications or technical journals. A dozen were printed in the *Transactions* of the American Society for Steel Treating within the past 10 months. A dozen other publications are in preparation on work that is practically completed. Were space available to give the titles of these publications, it would be obvious that the work is almost wholly research.

Metallurgical Advisory Committees

Research projects are chosen with the advice and counsel of the director of the Bureau, Dr. G. K. Burgess, whose executive duties preclude continuance of his previous constant attention to metallurgical problems but whose cooperation is no less real because confined to the broader aspects of the work.

Next among the cooperators are the metallurgical advisory committees. At the two-day meeting this spring 40 eminent metallurgists and 15 representatives of other Government departments met with 40 of the Bureau staff to discuss, from a very broad viewpoint, the past and future work of the division with special reference to the necessity and propriety of the application of public funds to those metallurgical problems.

Other divisions of the Bureau cooperate with the metallurgical division and the five sections of the division work as a unit, each project being really common to all. Last but not least comes the active cooperation of firms and individuals in the metallurgical industries who supply the products needed for study and give much information and advice.

It is easy to see that the study of methods of corrosion testing and of scratch hardness testing for the American Society for Testing Materials, or of methods of testing molding sand for the American Foundrymen's Association, are cooperative projects when it is recalled that special committees on these subjects meet at frequent intervals and that a considerable number of laboratories are carrying on experimental work and interchanging data. In other problems, such as the study, made for the American Ceramic Society, of blistering in cast iron for enameling, the work is equally divided between two cooperating divisions of the Bureau; in this case, ceramics and metallurgy.

In work for other Government departments, such as that on intercrystalline embrittlement of duralumin for the Navy, the Army, and the National Advisory Committee for Aeronautics, those bodies, several manufacturers and the mechanics division of the Bureau all cooperate actively with the work of the metallurgical division, while the Institute of Paint and Varnish Research aids in some of the exposure tests and the National Physical Laboratory of England is send-

[2] Bureau of Standards Circular No. 296—obtainable from superintendent of documents, Washington, 10c. (stamps not accepted)—gives a full account of the research associate plan.

[3] THE IRON AGE, Aug. 20 and 27, 1925, pages 461 and 536.

ing over specimens for test. Likewise, in the study of the wear resistance of railroad bearing metals, not only does the Chicago Bearing Metal Co. cooperate by stationing a research associate at the Bureau, but the engineers of tests of several railroads act informally as advisers.

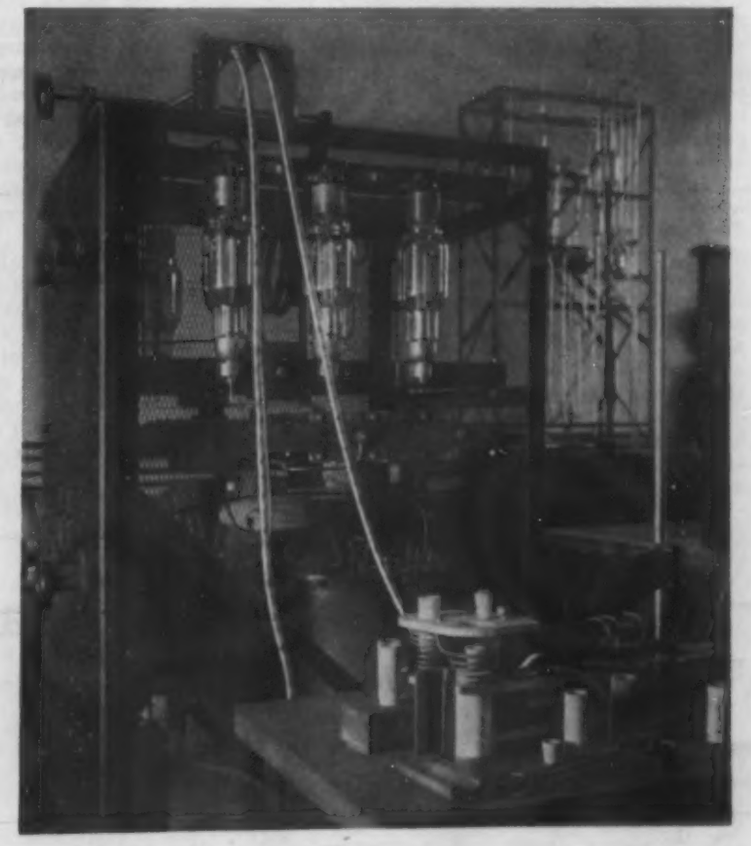
In the study of gage steels, which also involves the increasingly important subject of wear, there is an organized advisory group, the gage steel committee. Many gage makers and users have cooperated and the project is joint between the metallurgical and the weights and measures divisions.

High-Temperature Properties of Metals

The work on high-temperature properties of metals is oriented so as to supplement that of the joint high-temperature committee of the American Society for Testing Materials and the American Society of Mechanical Engineers.

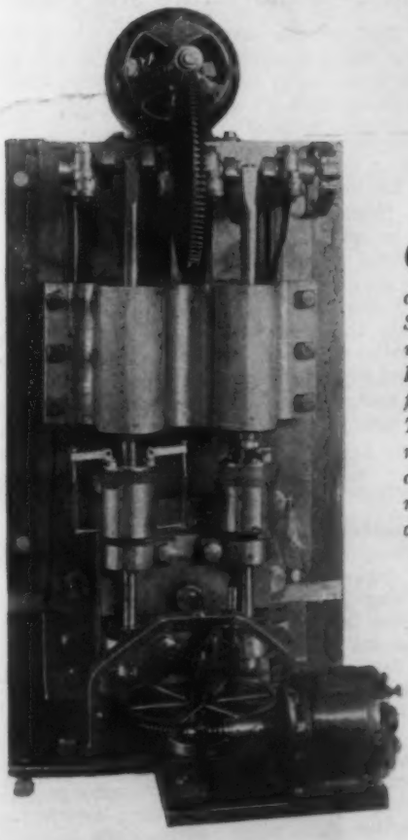
Abnormality in Steels

Projects of less broad scope are cooperative within the Bureau. In the work of purifying, melting and working platinum for the scientific uses of the whole Bureau, the chemical and metallurgical divisions work hand in hand. In the search for an improved alloy for Brinell balls for use on very hard steels, one section of the metallurgical division prepared the special iron-carbon-vanadium alloy, another heat treated it, a third made the metallographic examination, and a fourth, in cooperation with the Bureau shops, work-hardened the balls, and made flattening tests upon them, while

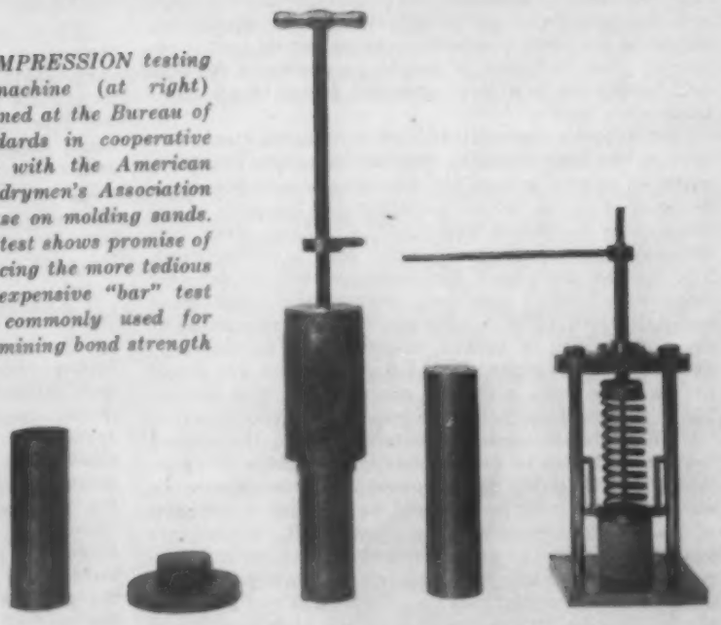


NEW high-frequency electric induction furnace (at right), operating at 200,000 cycles per sec. through the use of thermionic tubes such as are used for radio broadcasting. The furnace is used for cooperative work in melting platinum and in determination of gases in metals

WEAR testing machine (below) used in cooperative study of plug gages



COMPRESSION testing machine (at right) designed at the Bureau of Standards in cooperative work with the American Foundrymen's Association for use on molding sands. This test shows promise of replacing the more tedious and expensive "bar" test now commonly used for determining bond strength



the mechanics division made other tests upon them to check up on their utility.

Even in projects not guided by any established committee, cooperation is active. Take the study of quality of case hardening steels, the much-discussed problem of "abnormality." This was first brought before the Bureau by a motor car company.

The situation was first surveyed by visits to steel plants and carburizing plants. The opinion of practically every metallurgist in the country interested in the subject was solicited. Specimens of normal and abnormal steel were obtained from many commercial sources, and 63 experimental ingots of steel, made at one of the large steel plants, were examined. One steel company sent a representative to the Bureau to repeat and check some tests. This gave valuable ideas in regard to test procedure.

The Bureau of Mines has also taken up the problem, devoting itself largely to plant experimentation. The two bureaus keep up a constant interchange of data. A large steel corporation invited the Bureau of Standards to send a man to experiment together with its own metallurgists at its plant, using both open-hearth and electric furnaces to make up normal and abnormal steel. The list of cooperating firms includes a large proportion of the progressive automobile makers and steel makers.

One of the interesting developments in this work has been the relationship found between the presence of aluminum, or alumina, and abnormality. The optics division has made spectroscopic tests for aluminum on over 100 samples. The chemistry division made analyses for aluminum on specimens with varying amounts present and these figures, correlated with the intensity of the spectrum lines, made it possible thereafter to utilize the more rapid spectroscopic test.

Cooperative Method Is General

The cooperative method of attack, exemplified by this project, is used on all problems. By reason of its impartial position, with no "axe to grind," the Bureau is able to secure cooperative aid from the industry, and even from competitors in industry. This is one of the basic requirements for making a research both comprehensive and impartial. While the metallurgical industry is not so secretive as some other industries, many cases along metallurgical lines could be cited where the Bureau has been able to collect information that would scarcely have been available to a private investigator.

Much metallurgical work reported by the Bureau may very properly be considered as the product of cooperative work of the metallurgical industry itself, working with and through the Bureau, rather than as work in and of the Bureau alone.

The more fully the public understands the nature and scope of the metallurgical work of the Bureau, the more contacts will be established, which will result in still further application and extension of the cooperative idea. It is hoped that this article may further that understanding.

How to Treat Manganese Steel

Some Experience with Both the Cast and Forged Product—Manufacture and Heat Treatment of the Austenitic Type

BY DR. BIRGER EGEBERG*

SIR ROBERT HADFIELD of Sheffield, England, is the pioneer in the field of structural alloy steels. We have to give him the credit for the discovery and the first thorough investigation of an alloy steel, including the heat treatment to bring out its best properties. This last part is not to be neglected, because heat treatment is a most essential factor in all structural alloy steels.

Sir Robert's discovery of high-manganese steel dates back to the early eighties, and this steel was originally made by mixing molten ferromanganese and Bessemer-blown iron in the ladle. Consequently the ratio of the manganese to carbon was practically fixed, since both elements were introduced with the ferromanganese. The regular analysis of ferromanganese is 80 per cent manganese and 7 per cent carbon, the ratio being approximately 11 to 1. By adding ferromanganese to the molten iron in such a proportion as to obtain 11 per cent of manganese in the finished steel, one would at the same time arrive at about 1 per cent carbon. There is, therefore, not much opportunity for variation.

When the manganese content is low, the carbon content will also be proportionally low and vice versa. With less than a certain amount of manganese the metal is extremely brittle and in practice 9 per cent of manganese seems to be the low limit. Experience has shown that 12 to 14 per cent is best, with a corresponding carbon content of approximately 1.25 per cent. The silicon is usually around 0.30 per cent and the sulphur is always low, due to the high manganese content.

How the Steel Is Made

The making of the steel does not involve any particular difficulty. It can be made with success in any ordinary steel furnace. Where a reducing atmosphere can be obtained, it is the custom to make the additions of ferromanganese to the furnace. This method is followed when melting in the basic electric furnace, now extensively used for the production of manganese steel.

When using furnaces where only an oxidizing atmosphere can be maintained, like the Bessemer or open-hearth, it would be impossible to add the ferromanganese to the furnace itself because the manganese would be oxidized and go into the slag. The alloying must, therefore, in this case take place in the ladle and, as the ferroalloy makes up about one-fifth of the weight of the steel when losses are included, the alloy must be in the molten state. This necessitates two furnaces, one for melting the scrap and one for melting the alloy.

Electric Furnace Makes the Best Product

The best manganese steel is made in the electric furnace because here there is time enough for complete deoxidation and degasification and adjustment of the proper casting temperature. When the Bessemer or open-hearth furnace is used for melting, a highly oxidized metal is run out into the ladle. To this an enormous amount of ferromanganese is added, but the time for reaction must necessarily be short, due to the impossibility of keeping the metal in the ladle for any length of time. The poorer quality of this kind of steel must largely be due to this fact as well as to the greater difficulty in adjusting the temperature of the metal. Most manganese steel castings, however, do not require better metal than can be made in the Bessemer or open-hearth furnaces.

Manganese steel is very fluid and is therefore hard on furnace and ladle linings. Another effect of the cutting action of the fluid metal is a leaking stopper which often shows up early during casting of the metal into the molds. In bad cases, leaking of the stopper may be observed at the furnace during teeming of the metal into the ladle, but generally it does not show

*Metallurgist Halcomb Steel Co., Syracuse, N. Y.

Fig. 1 (at Left)—Manganese Steel Condition as Cast. Etched in picric acid

Fig. 2 (at Right)—Manganese Steel, Condition as Cast. Etched in picric acid

Both specimens magnified 200 diameters

up until the first mold has been filled. The waste of metal due to leaking stoppers can in bad cases go as high as 20 per cent of the whole heat and the casting of the metal will, even in the best cases, never proceed as well as when casting any other kind of steel, although special nozzles and stoppers are used when handling manganese steel.

Castings of Manganese Steel

Since much of this steel is used for castings, the writer will discuss the difficulties foundrymen are up against. The metal contracts during solidification about twice as much as common foundry steel. This must be taken into account when making the patterns. Furthermore, due to excessive piping, large feeders are needed to insure sound castings. But although this is true, many foundries use smaller feeders and risers on their manganese steel castings than on their ordinary castings. This may be due to the difficulty in removing large sinkheads of such steel and, in such cases, the castings will hardly be sound all through.

The steel is very brittle in the cast condition. Because of this it is preferable to take intricate castings out of the molds when still hot and allow them to cool down in a furnace, if one is to prevent cracking. This, however, ties up furnace capacity. In the writer's experience it is just as well to support with ribs the weak parts where contraction cracks are likely to develop, thereby making it possible to allow the castings to cool down in the molds.

Most of the castings in question, like jaws for stone breakers and crushing machinery, have a front wearing side and a back side and, in such cases, it is not necessary to remove the supporting ribs because the castings always are placed against a cushion of lead or some soft alloy. In other cases, the ribs must be removed with the cold chisel.

As the steel cannot be sawed, the feeders must be broken off. When they are too large for breaking, they can be cut off with the acetylene torch, but only after the castings have been heat treated, since otherwise cracks would develop. In other words, the heat-treated condition will stand the rapid and local heating of the torch without detrimental cracking as opposed to the steel in its cast condition.

Naturally, it is possible to heat the raw casting to something like 1000 to 1200 deg. Fahr., thereby putting it in a condition in which it can safely be cut, but this is at the best a hot and unpleasant job as well as expensive, although the gas consumption naturally is less than when cutting cold steel.

As all manganese steel castings have to be treated, it is the custom to cut the larger feeders after such treatment has been undertaken. Small feeders and risers should immediately be broken off from the raw casting because, after the heat treatment, they will usually be so tough as to necessitate the use of the torch on them.

Manganese steel in its cast condition is useless for all practical purposes on account of its brittleness. This is due to carbide boundaries around the grains as illustrated by Figs. 1 and 2. Fig. 1 shows broad carbide boundaries around the central grain and also shows the carbide bordered by a dark etching constituent, claimed by several authors to be troostite. With lighter etching, however, the dark constituents generally reveal a eutectic pattern, as illustrated by Fig. 2. Fig. 3 has been inserted so that the reader may better distinguish between the two light etching constituents of Fig. 2, namely, carbide and austenite. Fig. 3 represents the same specimen and the same spot as Fig. 2 after re-etching with sodium picrate. The carbide particles have been darkened, whereas the austenite remains unattacked. The dark lines traversing the austenite grains, especially noticeable in Fig. 1, may be martensite or carbide precipitated on slip planes.

The austenite grain in itself is tough and ductile but the surrounding carbide is brittle. If such a steel is hammered slightly when cold, it will be found under the microscope that ruptures take place around the grains and never through them, as illustrated by Fig. 4. The black lines around the grains represent ruptures.

Heat Treating Produces Austenitic Steel

The object of the heat treatment is to bring the carbides into solution, which is done by heating the steel to a fairly high temperature; 1800 deg. Fahr. is mostly used in practice, and then cooling it so rapidly in water that the carbides do not have time to precipitate. The steel in the heat-treated condition should show practically nothing but austenite, when examined under the microscope, as in Fig. 5.

As the size of the casting increases, the rate of cooling during the water quench decreases until, for a certain size, the cooling is not rapid enough to pre-

Fig. 3 (at Left)—Manganese Steel, Condition as Cast. Etched in picric acid and sodium picrate

Fig. 4 (at Right)—Manganese Steel, Condition as Cast. Etched in picric acid

Both specimens magnified 200 diameters

vent carbides from coming out of solution. The toughness of the steel will be impaired by the presence of precipitated carbides and the use of manganese steel is therefore limited to pieces of a size that can be successfully heat treated.

The castings should be taken out of the quenching bath when still a little warm, about 400 deg. Fahr., in order to relieve the strains to some extent, and this is the only draw that is necessary. If a subsequent draw is decided upon, the temperature should not be above 700 deg. Fahr., as the steel at higher temperatures will gradually lose its toughness, due to carbide precipitation, and finally return to its brittle cast condition.

Fig. 5—Small Manganese Casting, Heated to 1825 Deg. Fahr. and Quenched in Water. Etched in picric acid; magnified 200 diameters

The heat treatment will produce a casting free from scale and sand, and whatever cores there may be are exceedingly easy to remove after the quench, so that tedious cleaning is reduced to practically nothing with manganese steel.

Forged and Rolled Manganese Steel

We have up to this point considered manganese steel as castings only. Although the bulk of it is utilized for castings, there is a steadily growing demand for forged and hot-rolled sections like rails, jail bars, and so forth.

The steel is easy to burn but when properly heated the ingots can easily be hot-deformed to any size and shape. A fair degree of toughness will be found in smaller sections when these are cooled on the floor, but a considerable increase will be obtained by water cooling the bars from the temperature at which they leave the rolls, provided the temperature is not too low. A bar, 1 to 1½ in. round, when cooled on the floor, will take a bend of approximately 90 deg., whereas the bar, when cooled in water directly from the finishing pass, will in general take a bend of 180 deg. and will have, at the same time, its strength increased.

The yield from ingot to finished product is smaller than for any other kind of steel. The reasons are those mentioned when discussing foundry practice, namely, leaking stoppers and large contraction during solidification, causing heavy piping. The hot tops are usually filled twice but, even so, it is still necessary to crop the ingots more than usual, to insure sound material.

Physical Properties

The physical properties of manganese steel are of a peculiar kind that make it extremely valuable for special purposes where high strength and toughness, combined with high resistance against abrasion, are wanted. We saw that it was advisable, at least in castings, to quench the material in water in order to obtain these desirable qualities. Castings, treated in the above mentioned way, should show a minimum tensile strength of 90,000 to 110,000 lb. per sq. in. The elongation is about 20 per cent and the reduction is 35 to 40 per cent. The Brinell hardness is unchanged by the heat treatment and is in the vicinity of 200.

On account of the non-machinability of the steel, it is necessary to cast the tensile test pieces to shape and finish them by grinding. Small test pieces cast separately are, however, likely to show physical properties quite different from those of the casting and the test is therefore objectionable. In order to check the heat treatment of carloads, it is the custom to rely upon the bend test. If a 3/4 x 1 in. test piece, cast separately with rounded corners and heat treated together with the castings, will take a bend of 60 to 90 deg. before breaking, one may assume the steel to be in good condition.

This austenitic manganese steel is improved very much by forging. Forged and treated steel has a minimum tensile strength of 150,000 lb. per sq. in. and an elongation sometimes of more than 50 per cent. It is the only steel that shows a higher elongation than reduction. The Brinell hardness is about 200.

Hardening During Working

A priori, we would not expect good wearing qualities from a steel with such low hardness. The steel hardens, however, when put to use. When trying to cut the steel with a hack saw or a file, it is found to cut fairly easily during the first strokes, but then the steel hardens at the bottom of the cut, making it impossible to penetrate further. This is due to the formation of martensite or to carbides precipitated on slip planes. The steel acts as if it had a soft skin. In other words, when manganese steel is put to work, it will harden on the surface, thereby developing good wearing properties. When this surface slowly wears off, the layer underneath will harden and so on until the part is worn out.

It is evident that the wear must be severe enough to produce the mentioned change on the surface. If this does not take place, the manganese steel will not last any longer than most other kinds of steel.

The Possible Uses

Judging from physical properties, it is easy to determine the uses to which manganese steel is especially adapted. The common use is for jaws, plates and balls in crushers, for rails, crossings, dredging machinery and so forth. Rails at the curves of Bastille Station, Paris, a place where it previously had been necessary to put in new rails once a year, stood up for 7 years with 0.1 in. wear per year. The resistance to abrasions is the chief value of the steel and it may be used for all parts that have to stand severe wear, with the following reservations:

Though the strength of the material is high, the low elastic limit will make the steel fairly easy to deform. This feature makes it unfitted for very exact machine parts unless the acting forces are small. In such cases, however, the wear will most likely not be severe enough to obtain the full benefit of the manganese steel. The steel will, therefore, be of most advantage for heavy-working machine parts where some deformation is of no consequence. The steel will become brittle when heated above 700 deg. Fahr. and is therefore not adapted for parts likely to be heated to such temperatures. Furthermore, it should be remembered that the steel has no better non-corrosive properties than regular carbon steel and is therefore unfitted where steels corrode faster than they wear.

The non-machinable qualities of the steel must always be considered when deciding upon the usefulness of manganese steel. In the foundry it is, however, sometimes possible to use inserts of soft iron in places where machining is needed. This will not affect the life of the part because places to be machined are never located on the actual wearing surface. For example, certain parts require exactly located bolt holes. They would not be exact enough when cast around cores inserted in the mold. It is, however, possible to cast manganese steel around an iron bolt. A perfect weld will be obtained and afterward the holes are drilled in the soft iron.

Pipe Simplification Effective Sept. 1, 1927

The sizes of steel pipe eliminated to conform with simplified practice will be withdrawn by the National Tube Co. from the hands of distributers and the mills on Sept. 1, 1927, not Sept. 1 this year, as indicated in an article in THE IRON AGE of Aug. 26, page 584.

THE STEEL TREATERS'

Convention
and
Exhibit

Chicago, Sept. 20-24, 1926

THE IRON AGE
Sept. 9, 1926

Steel Treaters To Meet in Chicago

Technical Program and Exhibitors at Eighth Annual Gathering of American Society for Steel Treating, Sept. 20 to 24

WITH final preparations made for the eighth annual convention and national steel and machine tool exposition of the American Society for Steel Treating the gathering this year promises to easily eclipse all previous ones. The contrast between this year's affair and the first attempt in 1919 in the same city will be a most striking one. At that time only 6500 sq. ft. of exhibition space was used; this year about 80,000 sq. ft. is to be filled.

In addition, the Society of Automotive Engineers will hold a production meeting in the city during the same week while the machine shop practice division of the American Society of Mechanical Engineers will also assemble.

On the following pages the technical program for the steel treaters' convention and a list of the exhibitors and what they will offer are presented, an added feature being photographs of many of the representatives of leading companies. The account of the convention and exposition will be published Sept. 30.

Monday, Sept. 20

10 a. m.—Welcome by Chicago Chapter—T. E. Barker, chairman.

Address of Welcome—T. B. Purcell, general chairman.

Response—President R. M. Bird.

Technical Papers

Chairman—V. O. Homerberg.

"The Importance of Cementite" by R. G. Guthrie.

"Electric Annealing of Magnetic Materials for Telephone Apparatus" by W. A. Timm, Western Electric Co., Chicago.

"An Efficient Carburizing Furnace of the Surface Combustion Type" by Dr. A. E. White and E. R. McPherson.

Afternoon Session

Chairman—H. M. Boylston.

"Observations on the Microstructure of Path of Fatigue Failure in a Specimen of Armco Iron" by F. F. Lucas, Bell Telephone Laboratories, New York.

"Fatigue Strength of Hard Steels and Their Relation to Tensile Strength" by J. M. Lessells, Westinghouse Electric & Mfg. Co., East Pittsburgh.

"Corrosion-Fatigue of Metals as Affected by Chemical Composition, Heat Treatment and Cold-Working" by D. J. McAdam, Jr., United States Naval Academy, Engineering Experiment Station, Annapolis, Md.

Tuesday, Sept. 21

Morning Session

Steel Melting Session. Chairman—W. J. Priestley.

"Hair Cracks in Steel Rails" by J. H. Whitley, South Durham Steel & Iron Co., Ltd., Malleable Works, Stockton-on-Tees, England.

"Solidification of Steel in the Ingot Mold" by Alex L. Feild, United Alloy Steel Corporation, Canton, Ohio.

"Desulphurization of Steel" by E. J. Lowry, Hickman, Williams Co., Chicago.

"Basic Open-Hearth Practice" by C. H. Herty, Jr., Bureau of Mines Experiment Station, Pittsburgh.

Afternoon Session

Chairman—T. D. Lynch.

"Notes of the A_3 Stable Transformation" by H. A. Schwartz, National Malleable & Steel Castings Co., Cleveland.

"Graphitization at Constant Temperature Below the Critical Point" by H. A. Schwartz and H. H. Johnson, National Malleable & Steel Castings Co., Cleveland.

"The Graphitizing Behavior of Iron Carbide in Pure Iron-Carbon Alloys in the Critical Range" by H. P. Evans with Anson Hayes, Iowa State College, Ames, Iowa.

"Mechanical and Machining Properties of an Annealed Cast Iron" by G. C. Priester and F. J. Curran. G. C. Priester, University of Minnesota, Minneapolis.

Wednesday, Sept. 22

Morning Session

Annual Meeting of the American Society for Steel Treating. Chairman—R. M. Bird.

Report of Chapter Delegates.

Report of Officers.

Technical Papers

Chairman—Dr. A. E. White.

E. D. Campbell, Memorial Lecture.

"On the Corrosion-Resistance of Steels" by Dr. William M. Guertler, Germany.

"The Iron-Molybdenum System" by W. P. Sykes, General Electric Co., Cleveland.

Afternoon Session

Chairman—F. P. Gilligan.

"Cyanide Brittleness" by V. E. Hillman and E. D. Clark, Crompton & Knowles Loom Works, Worcester, Mass.

"Wear Resistance of Carburized Steel Versus Cast High-Manganese Steel" by W. J. Merten, Westinghouse Electric & Mfg. Co., East Pittsburgh.

"Wear of Steels with Particular Reference to Plug Gages" by H. J. French and H. K. Herschman, Bureau of Standards, Washington.

"Studies on Electric Welding" by L. J. Weber, University of Minnesota, Minneapolis.

Thursday, Sept. 23

Morning Session

Chairman—Dr. Albert Sauveur.

"On the Transformation of Retained Austenite into Martensite by Stress" by Kotaro Honda and Keizo Iwase, Tohoku Imperial University, Sendai, Japan.

"The Nature of Oil-Hardening Non-Deforming Tool Steels" by E. C. Bain and M. A. Grossmann. E. C. Bain, Union Carbide & Carbon Research Laboratories, Inc., New York. M. A. Grossmann, United Alloy Steel Co., Canton, Ohio.

"The Hardening of Metals by Dispersed Constituents Precipitated from Solid Solutions" by R. S. Archer, Aluminum Co. of America, Cleveland.

"Investigation of the Relationship Between the Standard Tension and Impact Tests on a Group of Steels of Varying Compositions" by Dr. F. C. Langenberg and H. C. Mann, Watertown Arsenal, Watertown, Mass.

Afternoon Session

Chairman—Dr. George K. Burgess.

"The Decomposition of the Austenite Structure in Steels" by R. L. Dowdell and Dr. O. E. Harder, University of Minnesota, Minneapolis.

"On the Light Metal Alloys" by Dr. William M. Guertler, Germany.

"The Tensile Properties of Stainless Iron and Other Alloys at Elevated Temperatures" by P. G. McVetty and N. D. Mochel, Westinghouse Electric & Mfg. Co., East Pittsburgh.

Friday, Sept. 24

Morning Session

Chairman—Prof. Bradley Stoughton.

"Failure of Bolt Steels" by V. T. Malcolm, Chapman Valve Mfg. Co., Indian Orchard, Mass.

"Internal Stresses in Quenched Steel" by S. L. Hoyt, General Electric Co., Schenectady, N. Y.

"Aluminum Bronze" by Jerome Strauss, United States Naval Gun Factory, Navy Yard, Washington.

"New Process of Surface Hardening Special Steels" by T. H. Nelson, Ludlum Steel Co., Watervliet, N. Y.

"Dendritic Crystallization and Grain Formation in Steels" by V. N. Krivobok, Bureau of Metallurgical Research, Carnegie Institute of Technology, Pittsburgh. (By title.)

Afternoon Session

Symposium of Hardness Testing Committee of the A.S.S.T. Chairman—Dr. H. P. Hollnagel.

"Standardizing the Brinell Hardness Test" by H. M. German, Universal Steel Co., Bridgeville, Pa.

"On the Hardness of Metals" by Dr. William M. Guertler, Germany.

"Correlation of Magnetic Properties with Mechanical Hardness in Cold-Worked Metals" by S. R. William, Amherst College, Amherst, Mass.

"Hardness Testing of Steel Balls by Magnetic Methods" by S. R. William, Amherst College, Amherst, Mass.

"Additional Notes on the Hardness and Toughness of High-Speed Steel" by Robert K. Barry, Barry Co., Muscatine, Iowa.

F. E. WINKELMAN
Sales Engineer
Acme Machine Tool Co., Cincinnati

A. L. GUILFORD
Manager, Chicago Office, Ajax Mfg. Co. Cleveland

C. B. CALLOMON
Metallurgical Engineer
Allegheny Steel Co.
Brackenridge, Pa.

L. W. GROTHAUS
Assistant Manager, Electrical Department
Allis-Chalmers Mfg. Co., Milwaukee

L. E. SWENSON
Chicago Representative
American Cynamid Co.
New York

Exhibitors at Steel Treaters' Convention, Products They Are Showing and Representatives Attending

A

ABRASIVE MACHINE TOOL CO., East Providence, R. I. Booths 217-240. No. 3 surface grinder equipped with motor drive, exhaust attachment, and Walker No. 520 magnetic chuck; No. 33 vertical spindle surface grinder, equipped with motor drive, generator and Walker No. 821 magnetic chuck; unit assemblies and attachments, including the new high speed attachment for No. 3 surface grinder. K. B. MacLeod and Walter Sceeles.

ACME MACHINE TOOL CO., Cincinnati. Booths 217-240. No. 2 full universal turret lathe with duo control, shown for the first time in actual operation on steel forgings. C. Meier, treasurer and general manager; H. V. Myers and F. E. Winkelman, sales engineers.

GEORGE ADAMS & SON, Chicago. Booth 36. Sections of steel showing process of manufacture from raw material to finished bar; sections of steel showing structure of unannealed, annealed and hardened pieces; dies and tools which have been in service. H. R. Adams, partner; R. M. Jaeckel, sales department; K. Engelsted, New York agent Soderfors Steel Works; A. M. Diehl, Cincinnati agent Soderfors Steel Works; H. H. Kurtz, Detroit agent Soderfors Steel Works.

AIR REDUCTION SALES CO., New York. Booths 145-149. Airco 99.5 per cent oxygen and Airco acetylene in cylinders; Airco Davis-Bournonville welding and cutting torches, regulators and supplies; Airco Davis-Bournonville oxygen discharge manifold; the radiagraph; the oxygraph. B. N. Law, manager of Chicago district; F. E. Maeurer, and Charles Williams, industrial engineering department; S. Shaykin and R. Miller, Chicago; G. E. Harcke, J. F. Callahan, New York; and G. Van Alstyne, advertising and publicity department.

AJAX MFG. CO., Cleveland. Booth 396-B. Model of Ajax heavy duty, twin geared motor upsetting forging machine, having new rocker type drop lock, top suspended header and die slides, positive die grip triple high tool holder, collapsible self-adjusting safety pitman and other features; a model of the Ajax direct gear, motor driven board drop hammer. John R. Blakeslee, president; H. D. Heman, general manager; W. W. Crilley, engineer; Gordon G. Fristoe, salesman, Cleveland; James A. Murray, New York office; A. L. Guilford, Chicago.

ALLEGHENY STEEL CO., Brackenridge, Pa. Booth 7. Ascoloy, a stainless iron alloy:—corrosion resisting, heat resisting and abrasion resisting; automobile pump shafts, various other automotive products produced from Ascoloy, as well as many interesting commercial developments, such as stainless Ascoloy corrugated roofing sheets, tubing, bars, sheets, etc. C. B. Callomon, metallurgical engineer; R. M. Allen, Chicago; J. A. Armstrong, Detroit; W. J. McArdle, assistant general sales manager.

CHAS. G. ALLEN CO., Barre, Mass. Booth 319A Four spindle feed machine and four spindle combination machine. Harding Allen.

ALLIS-CHALMERS MFG. CO., Milwaukee. Booth 163. Motors for machine tool and other drives, both alternating and direct current types; Texrope drive for short centers to be shown in operation. L. W. Grothaus, R. O. Gooding and G. L. England, Cincinnati; Walter Geist, C. L. Crosby, H. B. Mortimer and A. K. Birch, Milwaukee; F. L. Webster, B. F. Bilsland, W. R. Crawford, Charles McDonald, W. P. Daly, K. L. Siewers, J. A. Groff, S. Wolff, E. J. Kelley and E. M. Marvin, Chicago.

ALTO MFG. CO., Chicago. Motor driven high speed tapping machines. J. Brandstetter.

AMERICAN CRUSHER & MACHINERY CORPORATION, New York. Booth 380. One American chip

P. C. OSTERMAN
Vice-president and Chief Engineer
American Gas Furnace Co., Elizabeth, N. J.

K. A. JUTHE
President
American Metallurgical Corporation
Boston

J. A. STEINMETZ
President
American Resistor Corporation
Philadelphia

J. C. C. HOLDING
American Stainless Steel Co.
Pittsburgh

J. B. DOAN
President
American Tool Works Co., Cincinnati

H. ARMSTRONG
Armstrong Brothers Tool Co., Chicago

E. S. NORVELL
Manager Metal Cutting Department
E. C. Atkins & Co., Indianapolis

J. H. PENNIMAN
President
Atlas Press Co.
Kalamazoo, Mich.

H. HARDWICKE
Vice-President and District Manager
Atlas Steel Corporation, Dunkirk, N.Y.

JOHN NIELSEN
Vice-President
Badger Tool Co.
Beloit, Wis.

J. E. ANDRESS
Secretary and Treasurer, Barnes Drill Co.
Rockford, Ill.

RALPH SIMPSON
Sales Manager
Leon J. Barrett Co.
Worcester, Mass.

JOHN BATH
President and Treasurer, John Bath & Co., Inc., Worcester, Mass.

crusher specially designed for crushing long, fluffy turnings to decrease the volume and increase the weight. B. A. Wittkuhns, treasurer and general manager.

AMERICAN CYANAMID CO., New York. Booth 179. Case hardening furnace operating the Shimer process, in which a non-poisonous liquid bath is used; small samples of chemicals. L. E. Swensen and G. N. Omohundro, commercial department, American Cyanamid Co.; and E. B. Shimer, treasurer Shimer Chemical Co., Easton, Pa.

AMERICAN GAS ASSOCIATION, New York. Booth 180-A. Exhibiting under name of Peoples Gas, Light & Coke Co., Chicago. A working display, consisting of several types of automatic heat-treating machines and quenching tanks, as well as a complete display of oven furnaces, forges, salt baths, burner equipment and blowers.

AMERICAN GAS FURNACE CO., Elizabeth, N. J. Booth 177-A. A 600-lb. capacity rotary carburizing machine using gas for heating and for carburizing in operation with the cover of the retort removed to illustrate the uniform heating; a 100-lb. capacity rotary gas carburizing machine in actual operation; No. 125-A reciprocating hearth type heating machine with automatic quenching tank in operation; special pusher type heating machine known as No. 110 heating machine for hardening valve tappets in operation; also other heat treating equipment. P. C. Osterman, vice-president and chief engineer; John Mehrman, special representative; Gustav Schwab, development engineer; T. Farwick, Sr., automatic heat controller and burner expert; William J. Barenscheer, Chicago; O. T. Muehlemeyer, Rockford, Ill.

AMERICAN METALLURGICAL CORPORATION, Boston. Booth 86. One 20 kw. American Electric lead pot furnace in operation and one 30 kw. American Electric cyanide pot furnace. K. A. Juthe, president; S. N. Juthe, vice-president; John C. Juthe, sales manager; A. C. Wright and W. H. Ogden.

AMERICAN RESISTOR CORPORATION, Philadelphia. Booths 105 and 109. Globar electric heating elements in operation from 400 to 2800 deg. Fahr., featuring a new type terminal construction for non-metallic resistor elements operating at high temperatures in a furnace especially constructed to show the heating element and all of the interior of the furnace while being operated at 2450 deg. Fahr. furnace temperature. Joseph A. Steinmetz, president; W. E. Duerstein, vice-president; Harold N. Shaw, heating engineer; B. G. Tarkington, manager of industrial sales; O. E. Van Altena, manager of domestic sales; and K. E. Rogers, assistant manager domestic sales.

AMERICAN STAINLESS STEEL CO., Pittsburgh. Booth 62. Varied assortment of articles made from stainless steel and stainless iron. John C. Neale, president; Charles S. Bunting, secretary-treasurer; J. C. C. Holding.

AMERICAN TOOL WORKS CO., Cincinnati. Booths 246-251. Machine tools including lathes, shapers and radial drills. The 24-in. American auto-oiled shaper shown for first time. J. C. Hussey, Western sales manager; C. H. Cormany, F. L. Stubenroth.

AMERICAN TWIST DRILL & TOOL CO., Detroit. Booth 133. High speed twist drills, high speed track bits and high speed bonding bits. C. G. Munn, secretary and general manager; S. A. Tucker, Western representative; S. Sowden, metallurgist.

B. C. AMES CO., Waltham, Mass. Booth 277-B. Cabinet-type bench-lathe, bench milling machine with overarm support, triplex machine (combination lathe, milling machine and drill press) and micrometer dial gages; all in operation. Warren Ames, president.

ANDERSON DIE MACHINE CO., Bridgeport, Conn. Booth 282-A. Automatic and semi-automatic dial feed tapping machines for small parts. N. H. Anderson.

ARMSTRONG-BLUM MFG. CO., 335 North Francisco Avenue, Chicago. Booth 193. Marvel metal band saws, automatic high speed saws, hack saw machines, punches, shears and benders. Harry J. Blum, secretary; Francis J. Blum, treasurer; George J. Blum, vice-president.

ARMSTRONG BROTHERS TOOL CO., Chicago. Booth 189. Lathe, planer, shaper tools; lathe dogs, clamps, ratchet drills, drop forged wrenches; Armstrong-Vanadium wrenches, solid stocks and dies; adjustable stocks and dies, pipe cutters, pipe cutter wheels, hinged pipe vises, chain pipe vises, chain pipe tongs, pipe wrenches. Cut-off tool and Armstrong-Vanadium wrenches shown for the first time. S. Garrone, S. Welter, P. L. Armstrong, Lennox Armstrong and Horace Armstrong.

E. J. GOSSETT
President
Hill & Gossett Co.
Chicago

J. W. BLACK
Sales Engineer
Bellis Heat Treating Co., Branford, Conn.

FRANK A. HALL
Sales Engineer
W. N. Best Corporation, New York

ROBERT SHIMER
Sales Metallurgist
Bethlehem Steel Co., Inc., Bethlehem, Pa.

W. ROY MOORE
Sales Manager
Billings & Spencer Co., Hartford, Conn.

S. D. BLACK
President
Black & Decker Mfg. Co., Towson, Md.

W. H. BRISTOL
President
Bristol Co., Waterbury, Conn.

C. L. SAUNDERS
Brown Instrument Co., Philadelphia

J. G. SWINBURNE
Brown & Sharpe Mfg. Co.
Providence, R. I.

W. W. PRICE
President
Buckeye Portable Tool Co., Dayton, Ohio

ARMSTRONG CORK & INSULATION CO., Pittsburgh. Booth 90. Heat insulating materials, including several model furnaces, boiler settings and ovens insulated with Nonpareil or Armstrong's brick and Nonpareil block, Nonpareil cork coverings and fittings for refrigerated lines, Nonpareil high pressure covering for high temperature steam lines, Armstrong's corkboard for cold storage rooms, roof and residence insulation, panels of floor coverings, and Armstrong's cork gaskets and cork specialties. G. G. Oetting, Chicago; E. C. Lloyd, chief engineer; G. E. Hendricks, sales engineer; G. W. Nitchy, advertising department.

E. C. ATKINS & Co., Indianapolis. Booth 336. Silver Steel hack saw blades and frames; Kwik-kut metal cutting machines; No. 4 metal band saw machines; high speed machine knives; planer knives; circular saws; band saws; dado heads; grooving saws; hand, rip and panel saws. No. 4 metal cutting band saw shown for the first time. E. S. Norvell, manager metal-cutting department; Robert Eveland, Detroit; B. D. Tompson, metal cutting saw specialist.

ATLAS PRESS CO., Kalamazoo, Mich. Booth 262-A. Power arbor presses and hand arbor presses. James Collins, superintendent; J. H. Penniman, president.

ATLAS STEEL CORPORATION, Dunkirk, N. Y. Booth 53. Various hot-rolled sections and cold drawn products. Certain tool steel brands; high speed forgings of various kinds; plant photographs and micrographs. A. F. Dohn, president; C. P. Burgess, assistant to president; F. B. Lounsberry, vice-president and works manager; F. P. Case, special sales representative; H. Hardwicke, W. G. Zetsche and W. B. Moulton, Chicago; W. H. White, Cleveland; J. C. Gearhardt, Detroit; W. H. Wills, metallurgist.

AVEY DRILLING MACHINE CO., Cincinnati. Booths 245-249. Five high speed ball bearing drilling machines, showing Aveymatic feeding mechanism, tapping units, etc.; also new developments in direct motor driven drilling machines including the Motor-Avey and the Motor-Aveymatic. D. A. Patterson, secretary; F. L. Hazledine, salesman; J. G. Hey, vice-president and general manager; H. T. Merrieless, superintendent.

B

BADGER TOOL CO., Beloit, Wis. Booth 363. No. 224 double spindle Badger grinder, automatic, motor driven, wet grinding; Badger grinding disks. E. B. Gardner, president; John Nielsen, vice-president; H. I. Kelley, secretary; R. D. Gardner, treasurer; C. Stephenson and Roy Kipp, demonstrators.

BAKER BROTHERS, INC., Toledo. Booths 217-240. No. 50-H. hydraulic feed boring and drilling machines and quick change type drilling and boring machines. G. E. Hallenbeck, general manager; William Baker, treasurer; H. L. Tigges, sales engineer; W. W. Elliott, sales engineer.

BAKER-RAULANG CO., Cleveland. Booth 118. Locomotive crane, 12 ft. boom, 3000 lb. capacity, 7 ft. radius, with 12 cells of 21-plate Ironclad battery; type DTS 3-wheel tractor, with 30 cells a-8 Edison battery; Hertner vertical motor generator set with inclosed panel for automatic battery charging. W. F. Hebard and T. W. Barnes, sales engineers; V. A. Shouldis, field service department, and W. I. Lott, sales engineer.

BARBER-COLMAN CO., Rockford, Ill. Booth 338. Production type milling cutters using new Rigidmil; hobs and milling cutters; photographs and information on hobbing and hob sharpening machines. F. G. Hoffman, sales manager; W. D. Hintze, Chicago; R. P. Dewey, sales engineer; C. M. Cheadle, Jr.

BARDONS & OLIVER, Cleveland. Booth 317. No. 2 friction geared head screw machine; 13-in. plain head motor driven screw machine; 8-in. cut-off machine. L. Oliver.

W. F. & JOHN BARNES CO., Rockford, Ill. Booths 310-328. No. 300, 20-in. general purpose production drill with silent chain motor drive and No. 340, 20-in. single purpose production drill with direct built-in motor drive, Timken bearing design; both shown for the first time. John S. Barnes, president, and V. A. Root.

BARNES DRILL CO., Rockford, Ill. Booth 253. No. 212 hydraulically reciprocated honing machine; No. 205 self oiling, all geared automatic tapping machine; No. 246 self oiling, all geared drilling machine; No. 210 self oiling, all geared, all ball bearing drilling machine; No. 266 self oiling, all geared, heavy duty drilling machine; 22-in. self oiling, all geared heavy duty drilling machine. No. 212 honing machine shown for the first time. R. S. Walker, expert mechanic; J. E.

H. W. WENDT
President
Buffalo Forge Co.
Buffalo, N. Y.

S. NARAMORE
Sales Manager
Andrew C. Campbell, Inc.
Bridgeport, Conn.

S. F. COURTER
General Sales Manager
Carborundum Co.
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G. R. MURRAY
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Chambersburg Engineering Co.
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WM. HIGBURG
Sales Manager
Char Products Co.
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A. H. TEUCHTER
President
Cincinnati Bickford Tool Co., Cincinnati

R. E. FIELD
Specialist
Cincinnati Milling Machine Co.
Cincinnati

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President
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Sales Manager
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Cincinnati

W. W. CROOKER
Sales Engineer
James Clark, Jr., Electric Co., Louisville

J. JENNE
Cleveland Planer Co.
Cleveland

H. P. JENSON
Assistant Sales Manager, Cleveland Twist Drill Co., Cleveland

B. F. PHILLIPSON
President
Climax Molybdenum Co., New York

H. M. BRAY
Chicago Manager
Colonial Steel Co.
Pittsburgh

OTTO LUNDELL
President, Colonial Tool Co., Inc., Detroit, and Vice-President, Michigan Tool Co., Detroit

G. R. PORTER
Sales Manager
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.

Andress, secretary and treasurer; A. M. Johnson, superintendent; A. G. Block, assistant secretary; W. M. Fairbairn, production manager; F. A. Swanson, designing engineer.

LEON J. BARRETT CO., Worcester, Mass. Booth 376. No. 500 Curtis centrifugal oil extractor, especially developed to handle the oil reclaiming problem, shown for the first time. Leon J. Barrett; Ralph Simpson, sales manager.

EDWIN E. BARTLETT, Nashua, N. H. Booth 366. Bartlett presses. Charles H. Fuller and Edwin E. Bartlett.

JOHN BATH & CO., INC., Worcester, Mass. Booth 204. High speed steel ground taps, high speed steel ground thread gages and internal micrometers. John Bath, president and treasurer; J. Chester Bath, vice-president; Stanley W. Bath; Robert E. Lamb, secretary.

BAUSCH & LOMB OPTICAL CO., Rochester, N. Y. Booth 100. Large metallographic equipment including precentered and permanently alined metalloscope with illuminating unit, telescopic focusing device and simple shock absorbing system; contour measuring projector; tool maker's microscope with protractor eye-piece for checking angle of screw threads and thread diameter attachment; binocular microscope with a specially large field; metallurgical microscope and other accessories; magnifiers and readers for machine and tool makers. Tool maker's microscope, binocular microscope and new magnifiers shown for the first time. W. T. Jane, Chicago manager; F. C. Lau, representative for metallographic equipment, Chicago; W. L. Patterson, technical bureau; I. L. Nixon, sales manager; George Gallasch, technician, all of Rochester.

BEARIUM BEARINGS, INC., Buffalo, N. Y. Booth 72-A. Bearing metals and castings. H. G. Pagani, vice-president and general manager; W. H. Judy, chief engineer; A. W. Corrigan, sales engineer.

BELL & GOSSETT CO., Chicago. Booth 55. Steel treating materials and equipment. The B. & G. oil cooler shown for the first time. E. J. Gossett, president; W. C. Bell, vice-president and treasurer; R. E. Soules, James Ayling, G. A. Mies.

BELLEVUE INDUSTRIAL FURNACE CO., Detroit. Booth 144. Conveyor type spot heating forge furnace, gas and oil burners and an assortment of special shape fire brick. Walter E. Hinz, president; Louis J. Raymo, sales manager.

BELLIS HEAT TREATING CO., Branford, Conn. Booth 35. Annealing lavite, carbon lavite and tempering lavite. A. E. Bellis, president; J. W. Black, sales engineer; J. J. Lynch, Industrial Engineering & Equipment Co.; M. K. Epstein, St. Louis; both Western sales representatives.

W. N. BEST CORPORATION, New York. Booth 173. Oil burners and industrial furnaces. H. B. Dempsey, manager; H. E. Vollmers, sales manager; Frank A. Hall, sales engineer.

BETHEL-PLAYER CO., Westboro, Mass. Booths 310-328. Crankshaft lapper, type U combination lapper for cylindrical and flat work and H. hole lapper for lapping bushings. Sydney Player, president and general manager; G. E. Hulbert, sales engineer.

BETHLEHEM STEEL CO., INC., Bethlehem, Pa. Booths 42, 43, 46 and 47. Stainless steel, hardened steel rolls, drop and pressed forgings, specialty pressed forgings, alloy and tool steels, rolled steel I-beam wheels for motor trucks, charcoal iron manufacturing process and products, hollow drill steel and samples of laboratory and mill tests. George A. Richardson, manager technical publicity department; W. R. Shimer, sales metallurgist; A. P. Spooner, engineer of tests; H. C. Bigge, superintendent tool steel department; J. M. Silvester, superintendent forges and foundries; George Buchner, drop forge department; R. A. MacDonald, foundry expert; C. E. Chamberlin, tool steel sales agent; R. S. Tucker, alloy steel sales agent; W. C. Cutler, bar department sales agent; J. C. Tobias, technical publicity department.

BILLINGS & SPENCER CO., Hartford, Conn. Booth 272. Die sinking and trimmer die making machines. Howard Oberg, machinery salesman; W. Roy Moore, sales manager.

BILTON MACHINE TOOL CO., Bridgeport, Conn. Booths 310-328. No. 8 Producto-matic miller with cabinet base, arranged for motor drive and equipped with a four-station turret work fixture. N. M. Marsilius, president; A. J. Cummings, sales manager; M. E. Gombar, superintendent and chief engineer.

BLACK & DECKER MFG. CO., Towson, Md. Booths 188, 192, 196 and 200. Portable electric drills,

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President
Columbia Tool Steel Co.
Chicago Heights, Ill.

JOHN H. GLOVER
Chicago Representative, Cone Automatic Machine Co., Inc., Windsor, Vt.

A. H. KINGSBURY
Crucible Steel Co. of America, New York

DR. C. T. EVANS
Representative
Cyclops Steel Co., Titusville, Pa., and Universal Steel Co.
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P. H. DANLY
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E. M. CONVERSE
Director of Specialties
Dearborn Chemical
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Driver-Harris Co.
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PEIRCE SCHENCK
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Duriron Co., Inc.
Dayton, Ohio

EDWIN I. HOPE
Secretary
Eaton Electric Furnace Co., Taunton, Mass.

portable electric grinders, heavy duty electric grinders and snaggers and swing grinders. Heavy duty grinders, snaggers, buffers and swing grinders shown for the first time. S. D. Black, president; W. C. Allen, sales supervisor; R. W. Proctor, sales manager; R. D. Black, advertising manager; R. E. Mizener, special representative; G. M. Buchanan, R. S. Mitten, H. B. Hazerodt, G. Merriell, W. R. Sprague, J. A. Fairfield, A. H. Walter, J. T. McQuillin, A. M. York, T. H. Belling, J. K. Courim and C. M. Hall, sales department.

BLACKER ENGINEERING Co., New York. Booth 364-B. Human-mechanical blacksmith helper. A. B. Drullard, president; J. W. Norris, operator; W. K. Stamets, agent.

BLAKE & JOHNSON Co., Waterbury, Conn. Booth 280-B. Gang slitting machine in operation. Wadsworth Doster, manager; P. D. Peterson, demonstrator.

G. S. BLAKESLEE & Co., Cicero, Ill. Booth 377. Metal parts cleaning machines. J. W. Dammers, sales manager; G. R. Blakeslee, president; G. P. Anstiss, secretary; A. S. Reichel.

BLANCHARD MACHINE Co., Cambridge, Mass. Booths 217-240. No. 16 Blanchard surface grinder in operation, Blanchard wheel mounter and samples of work. Ball bearing wheel head and larger water capacity on surface grinder shown for the first time. H. F. Skillings, C. L. Jones, H. C. Donovan.

BOTFIELD REFRACTORIES Co., Philadelphia, Pa. Booth 110-B. Unusual forms of firebrick construction including single ring arch with 150 lb. of refractories supported by a thin layer of firebrick cement. Axel H. Engstrom, sales engineer; W. B. Smith, factory representative; H. F. Krieg, manager refractories division W. E. Dee Co.

BOYLE VALVE Co., Chicago. Booth 12-A. Poppet valves for internal combustion engine. E. Von Hambach, director of sales and engineering; J. Weiss and L. Q. Song, sales department.

BRIDGEPORT SAFETY EMERY WHEEL Co., Bridgeport, Conn. Booth 395. One No. 7 motor driven floor grinder, one No. 6 motor driven floor grinder, one No. 23-M motor driven buffing lathe, one No. 23 belt driven buffing lathe, one No. 8 belt driven floor grinder and one No. 174 radial swing crane grinder, all with sectional grinding wheel. H. H. Peck, secretary; I. L. Burritt, sales manager; H. E. Smith, demonstrator.

BRISTOL Co., Waterbury, Conn. Booth 88. Indicating and recording pyrometers and temperature controllers, including automatic air, oil and gas valves for use in connection with heat treatment of steel. H. L. Grigga, general sales manager; L. G. Bean, Chicago; R. M. Walker, Pittsburgh; H. W. Moss, Detroit; S. W. Case, St. Louis; H. A. Graf, C. Worth, T. F. Hering and H. W. Hill, Chicago.

JOHN BROWN BOILER Co. OF ILLINOIS, St. Louis. Booth 186-A. Steam generator. William J. Meckel.

D. P. BROWN & Co., Detroit. Booth 339A. Teon belting, black leather belting and woven endless belts. W. R. Brown, president; W. W. Nichols, vice-president and mechanical engineer; R. W. Holden, Chicago.

BROWN INSTRUMENT Co., Philadelphia. Booth 83. Pyrometers, thermometers, carbon dioxide meters, automatic temperature control indicating and recording instruments. G. W. Keller, sales manager; M. M. Watkins, assistant sales manager; C. L. Saunders, Chicago; R. W. Mayer, Detroit; F. M. Poole, Tulsa; C. E. McGregor, J. R. Greene, R. W. Conwell, L. B. Hammersley and W. D. Rolfe.

BROWN LYNCH SCOTT Co., Monmouth, Ill. Booth 153A. New style ball bearing perfection carburizing compound cleaner and grader. J. A. Scott, secretary and general manager; W. B. Lynch, manager compound cleaner division.

BROWN & SHARPE MFG. Co., Providence, R. I. Booths 393A and B. No. 44 gear hobbing machine; No. OG high speed automatic screw machine; No. 2 universal grinding machine; No. 2 surface grinding machine; No. 3B plain milling machine; cutters and hobs; machinists' tools. H. G. Abbott, G. B. Beale, T. A. Day, R. E. Doras, F. B. Evans, A. G. Jacobson, H. K. Jackson, W. H. Stewart, W. A. Weatherhead, H. G. Clayton, salesmen; and J. G. Swinburne and W. Spencer, factory representatives.

BRYANT CHUCKING GRINDER Co., Springfield, Vt. Booth 269. Bryant internal grinder in actual production of automotive parts. J. B. Johnson, chief engineer; W. L. Bryant, president; L. C. Gilchrist, Western representative; R. O. Perry, sales engineer.

A. J. MOORE
Vice-President
R. E. Ellis Engineering Co., Chicago

SAM DANITS
Sales Manager
Louis E. Emerman & Co., Chicago

S. J. MARSHALL
President
Endicott Forging & Mfg. Co., Inc.
Endicott, N. Y.

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Secretary
E. L. Essley Machinery Co., Chicago

C. A. ODEGAARD
President
Federal Machinery Sales Co., Chicago

J. E. LOSHBOUGH
President and General Manager, Federal Press Co., Elkhart, Ind.

R. Y. FERNER
Representative, Societe Genevoise d'Instruments de Physique, R. Y. Ferner Co.
Washington

J. H. OETJEN
Factory Engineer
Charles Engelhard, Inc., Newark, N. J.

E. T. JACKMAN
Firth-Sterling Steel Co.
McKeesport, Pa.

W. C. DAVIS
President
Foote Brothers Gear & Machine Co.
Chicago

W. H. FOSTER
President
Foster Machine Co.
Elkhart, Ind.

E. GAIRING
President
Gairing Tool Co., Inc.
Detroit

B. C. SAUNDERS
Secretary and Sales Manager
Gallmeyer & Livingston Co.
Grand Rapids, Mich.

F. E. GARDNER
Vice-President
Gardner Machine Co., Beloit, Wis.

F. H. KIND
W. Gaterman Mfg. Co.
Manitowoc, Wis.

EMIL GATHMANN
President
Gathmann Engineering Co.
Baltimore

BUCKEYE PORTABLE TOOL CO., Dayton, Ohio. Booth 364-A. Small portable air tools. Improvements in the No. 002 and No. 34 drills and new sanding machine shown for the first time. W. W. Price, president; C. L. Humphrey, Detroit; H. O. Gunmere and W. R. Gunmere, special representatives; H. W. Leighton, Chicago; A. E. Welch, Milwaukee.

BUFFALO FORGE CO., Buffalo. Booth 268. Punches and shears, bar cutters, forges, drills, blowers, cooling fans, pumps and benders. E. G. Leonard, sales manager; W. J. McDowell, sales representative; H. W. Wendt, Jr., vice-president.

BULLARD MACHINE TOOL CO., Bridgeport, Conn. Booths 217-240. Vertical turret lathe and Mult-Au-Matic production equipment. J. W. Bray, sales manager; E. P. Blanchard, J. M. Welch, Robert Newman and Frank Steinmetz.

C

CALORIZING CO., Pittsburgh. Booth 124-C. Calorized steel annealing box; Calorized pressed steel lead pot; Calite alloy carbonizing box; section of Calite furnace skid rail; Calite I-beam. R. S. Brown, B. J. Sayles.

ANDREW C. CAMPBELL, INC., Bridgeport, Conn. Booth 296. No. 2 Campbell nibbling machine cutting $\frac{3}{8}$, $\frac{5}{16}$, $\frac{1}{4}$ and $\frac{3}{16}$-in. steel; No. 1-B nibbling machine cutting $\frac{5}{16}$, $\frac{1}{8}$ and $\frac{1}{16}$-in. steel; No. 1 nibbling machine, belt drive type, not operating. Stuart Naramore, sales manager; J. Johnson, demonstrator.

CARBORUNDUM CO., Niagara Falls, N. Y. Abrasives Division. Booth 185. Carborundum and Aloxite abrasive wheels; Carborundum grains and Aloxite polishing grains; rubbing bricks; Carborundum and Aloxite disks; Carborundum and Aloxite and garnet abrasive papers and cloths; sharpening stones. S. F. Courter, assistant general sales manager; R. C. Bradbury, C. T. Engman, C. H. Niekamp and George Harden, representatives.

CARBORUNDUM CO., Perth Amboy, N. J. Refractories Division. Booth 65. Model of car-type oil-fired annealing furnace; model of wire patenting furnace; small gas-fired furnace designed to show relative thermal conductivity of Aloxite, Carborundum and fire-clay; standard Carbofrax and Aloxite refractory brick and shapes; Aloxite and Carborundum cements. R. A. Beverly, Chicago sales representative; C. A. Dutton, Detroit sales representative; W. M. Smith of W. M. Smith Co., New York; S. A. Fenno, assistant sales manager Carborundum Co.

CARLTON MACHINE TOOL CO., Cincinnati. Booths 310-328. 5-ft. heavy duty radial drill and 3-ft. heavy duty radial drill. J. C. Carlton, president and general manager; H. J. Westmeyer, service man.

CARPENTER STEEL CO., Reading, Pa. Booth 74. Carpaloy corrosion resisting steels and tools made from Stentor oil-hardening tool steel. J. H. Parker and W. S. Jones, vice-presidents; R. V. Mann, assistant to president; B. H. DeLong, metallurgist; J. B. Guthrie, C. A. Heil and C. W. Olsen, district sales managers; L. E. Cooney, H. J. Joyce, Jr., R. L. Williams, C. W. Windfelder and W. S. Yates, sales representatives; F. R. Palmer, metallurgical department; George H. Edmonds, sales department, Reading.

CASE HARDENING SERVICE CO., Cleveland. Booth 55. Carburizing compounds, charcoal, bone, cyanide compounds, all grades; non-case, anti-carburizing paint. Cleancoat, covering for lead baths. Drawite, drawing salts of all ranges. Bathite, hardening salts; heat resisting metal. carburizing boxes, lead and cyanide pots. High temperature furnace cements. Other essential hardening room supplies. W. C. Bell, president; E. J. Gossett, vice-president; J. S. Ayling, sales manager.

CELITE PRODUCTS CO., Los Angeles. Booth 85. Small electric furnace constructed of Sil-O-Cel brick and fire brick to show the difference in the heat conductivity of these materials. Display of Sil-O-Cel, including Sil-O-Cel natural brick, Sil-O-Cel C-22 brick, Sil-O-Cel super brick, Sil-O-Cel C-3, Sil-O-Cel C-3 concrete, Sil-O-Cel powder, Sil-O-Cel coarse fraxite high temperature cement, Sil-O-Cel block, Sil-O-Cel single and coat plastic and Celcote. N. E. Baxter, T. E. Ventriss, H. N. Haberstroh, Chicago district managers; Stephen Mahon, assistant manager central division; C. A. Frankenhoff, manager central division; E. S. Crosby, general sales manager.

CENTRAL ALLOY STEEL CORPORATION, Massillon, Ohio. Booths 66-71. Special alloy steel products

G. A. DENISON
Sales Manager
Geometric Tool Co.
New Haven, Conn.

H. B. KRAUT
Vice-President and General Manager
Giddings & Lewis Machine Tool Co.
Fond du Lac, Wis.

C. S. GORDON
President and Manager
Claud S. Gordon Co.
Chicago

F. G. EBERHARDT
Gould & Eberhardt
Newark, N. J.

AUGUST MARX
Vice-President and General Manager
G. A. Gray Co.
Cincinnati

R. B. HUBBELL
Manager, Machine Tool Department, Greenfield Tap & Die Corporation
Greenfield, Mass.

J. T. LEYDEN
Halcomb Steel Co.
Syracuse, N. Y.

M. F. McCORMICK
Chicago Branch Manager
Heald Machine Co.
Worcester, Mass.

H. A. MOORE
Field Manager
High Speed Hammer Co., Inc.
Rochester, N. Y.

C. A. HOEFER
Secretary and Treasurer
Hoefer Mfg. Co.
Freeport, Ill.

and photographs of various mill operations. W. M. Garrigues, D. B. Carson, G. F. Hess, M. H. Schmid, F. W. Krebs, L. K. Townsend, G. W. Wagstaff, T. B. Davies, F. L. Gibbons and L. S. Allen, sales department; M. A. Grossman, C. P. Richter, A. L. Field, R. K. Bowden, R. L. Wilson, W. W. Loeffler, L. C. Miller, M. J. Norris, C. C. Snyder, A. J. Wilson, J. D. Gardner and F. H. Johnson, metallurgical department.

CHAMBERSBURG ENGINEERING CO., Chambersburg, Pa. Booth 388. Working models of type B steam drop hammer and type F board drop hammer, the type B hammer being shown for the first time and featuring the following in design and construction: Interlocking tie plates, keyless cam, universally adjusted guides, patented safety cylinder cover and new anvil construction. William H. Derbyshire, Jr., president; Eugene C. Clarke, vice-president and general manager; G. R. Murray, sales engineer.

W. R. CHAPIN CO., Indianapolis. Booth 165. Cemented lathe and planer tools; cemented tools for machining limestone, marble and granite; cemented punches and dies, and special tools; cemented shear blades for steel and cemented woodworking knives and special woodworking tools. W. R. Chapin, president; S. G. Chapin, secretary; W. L. Appel, metallurgical engineer.

CHAR PRODUCTS CO., Indianapolis. Booth 58. Char carburizing compounds made by a patented process whereby the energizing material is sealed within each particle of the compound by a protective coating or shell of pure carbon; annealing carbon; lead pot carbon; electrode carbon; Reilly carbon. Dr. I. H. Derby, director of research; C. B. Edwards, chemical engineer; H. R. Horner, production manager; William Higburg, sales manager.

CHICAGO PNEUMATIC TOOL CO., Chicago. Booth 360. Complete compressed air station supplying air to all exhibitors who will require it.

CINCINNATI BICKFORD TOOL CO., Cincinnati. Booths 217-240. 5-ft. radial drilling machine. August H. Tuechter, president; G. P. Gradolf, treasurer; D. C. Klausmeyer, general superintendent; R. M. Husband and N. C. Schauer, sales engineers.

CINCINNATI MILLING MACHINE CO., Cincinnati. Booths 217-240. Two No. 2 High Power milling machines; 24-in. automatic milling machine; one 12 x 72-in. self-contained grinding machine; one No. 2 centerless grinding machine. W. W. Tangeman, manager of sales; R. E. Field, special representative Chicago district; C. F. Roby, service department; L. V. Johnston, E. Belle, L. E. Mehlhope and Frederick B. Heitkamp.

CINCINNATI PLANER CO., Cincinnati. Booths 217-240. Hypro planer in operation. B. B. Quillen, president; G. Langen, vice-president; T. B. Frank, treasurer; C. E. Linden, sales manager; G. Lamoth, planer foreman; J. G. Dawn, production manager; G. D. Walker, secretary.

CINCINNATI SHAPER CO., Cincinnati. Booths 366-376. 20-in. heavy Cincinnati Climax shaper with universal table. H. S. Robinson, sales manager; R. T. Hazelton, works manager; George Diehl and R. N. Piper.

CLARK EQUIPMENT CO., Buchanan, Mich. Booth 32.

JAMES CLARK JR. ELECTRIC CO., Louisville, Ky. Booth 265. Portable electric drills, stationary electric drills, portable grinders, stationary grinders, electric screw drivers. W. W. Crooker, sales engineer; Carl Jackman, engineer.

CLARK TRUCTRACTOR CO., Buchanan, Mich. Booth 32. Clark Tructractor, low side auto dump with 2-ton, 30-cu. ft. load carrying body; Clark Truclift, standard 2-ton model; Clark Duat, a small gasoline industrial truck and tractor with a towing capacity of 2 tons, and Clark trailer. The trailer shown for the first time. E. B. Ross and M. L. Hanlin, vice-presidents; J. W. Taylor, Detroit manager; Walter Nochumson, Chicago manager; F. E. Cooper, Pittsburgh manager; Ezra W. Clark.

CLEVELAND AUTOMATIC MACHINE CO., Cleveland. Booth 365. ⅞-in. Cleveland multiple spindle; 1-in., model J, double end threading machine; ¾-in. model H chucking machine. A. L. Garford, president; H. N. Rupple, assistant general manager; H. M. Rich, treasurer, Herbert E. Nunn, Western sales manager; Bart C. Young, Detroit representative.

CLEVELAND PLANER CO., Cleveland. Booths 266-267. 36-in. Cleveland open side planer. J. Jenne, L. H. Mesker.

F. W. ENGLAND
Vice-President
Illinois Tool Works
Chicago

V. V. CAYWOOD
Chicago Representative
International Machine Tool Co.

P. D. MERICA
Director of Research
International Nickel Co., New York

W. A. SALT
Jessop Steel Co.
Washington, Pa.

JOHN C. PRICE
Chicago Representative
Jones & Lamson Machine Co.
Springfield, Vt.

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Vice-President in Charge of Sales
Jones & Laughlin Steel Corporation
Pittsburgh

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Chicago Branch Manager
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Milwaukee

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Vice-President in charge of Metallurgy
Interstate Iron & Steel Co., Chicago

JULES DIERCKX
Vice-President and Sales Manager
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E. J. KINGSBURY
Manager
Kingsbury Mfg. Co.
Keene, N. H.

E. LINDEBLAD
General Manager
Kloster Steel Corporation
Chicago

W. B. KNIGHT, JR.
Treasurer
W. B. Knight Machinery Co.
Chicago

C. N. KIRKPATRICK
Sales Manager
Landis Machine Co.
Waynesboro, Pa.

W. ZIELER
Technical Representative
E. Leitz, Inc.
New York

RALPH S. DYSON
Link-Belt Co.
Chicago

FRED ALBRECHT
Sales Manager
Lodge & Shipley Machine Tool Co.
Cincinnati

CLEVELAND TWIST DRILL CO., Cleveland. Booths 202-207. Cle-Forge high speed drills in two high speed motor driven presses, drilling various materials at high speeds and feeds. Spirex reamers shown for the first time. H. P. Jenson, assistant sales manager; H. A. Baier, chief engineer; J. B. Dillard, general superintendent; T. M. Skove and D. D. Burdett, assistant general superintendents, J. G. Ladrick, H. A. Bokram, Thomas Thomas, H. S. White, A. J. Ireland, W. L. Evans, I. P. Farnum, H. E. Bergquist and F. A. Kelly, sales representatives.

CLIMAX MOLYBDENUM CO., New York. Booth 28. Calcium molybdate, ferromolybdenum, molybdenite concentrates and parts made of molybdenum steel. B. F. Phillipson, president, J. D. Cutter, vice-president; Alan Kissock, J. Kent Smith, J. B. Thorpe, and W. P. Woodside.

CLIPPER BELT LACER CO., Grand Rapids, Mich. Booth 141. Four models Clipper Belt lacers, two models Clipper Belt cutters; three styles connecting pins, six sizes regular Clipper Belt hooks; Rustproof Clipper Belt hook; Morring belt display, electrically operated. George E. Farmer, factory representative.

COCKRANE-BLY CO., Rochester, N. Y. Booths 217-240. No. 66 metal sawing machine; No. 11 automatic saw sharpening machine; No. 14 duplex universal vertical miller-shaper. W. H. Welch, vice-president.

COLBURN WORKS, CONSOLIDATED MACHINE TOOL CORPORATION, Cleveland. Booths 266-267. 48-in. heavy duty boring mill; D7 heavy duty drill press; Alfred Trosch, chief engineer; C. R. Williams, salesman.

COLONIAL STEEL CO., Pittsburgh. Booths 194 and 195. Tools made from Colonial products and products manufactured by Colonial mill. J. Trautman, Jr., general sales manager; N. B. Hoffman, metallurgist; H. M. Bray, Chicago manager; W. Earl Thurber, special representative; W. W. Shaw, R. I. Beeson and J. S. Froelich, Chicago.

COLONIAL TOOL CO., Detroit. Booth 164. Broaching tools and spline and serration gages; Easy Cut and Easy Pull combination broaches; Hy-speed broach puller shown for the first time. Otto Lundell, president; T. A. Oleck, sales engineer; S. A. Tucker and E. M. Gripton, Chicago.

COLT'S PATENT FIRE ARMS MFG. CO., Hartford, Conn. Booth 400. Model 21-217A metal parts machine for cleaning screw machine products and for removing oil and chips from parts in process preparatory to subsequent operations; special machine for washing parts coming from the Blanchard automatic grinder. G. R. Porter, sales manager; C. M. Jackson, G. N. Daubach and G. C. Fraser.

COLUMBIA TOOL STEEL CO., Chicago Heights, Ill. Booths 75-79. New and used tools, rack of finished bars of tool steel; ingots and semi-finished tool steel and raw materials, including alloys used in making tool steel. Arthur T. Clarage, president; C. B. Shoenberger, superintendent; W. J. Mathews, melting superintendent; R. B. McCauley, chemist and metallurgist; A. J. Scheid, Jr., metallurgist; E. H. Pasmore, Chicago; A. J. Scheid, Milwaukee; G. C. Beebe, Cleveland; Alex Luttrell, Detroit; F. A. Terry, Cincinnati district sales manager; C. M. Rutledge, Chicago; Thomas Dougall, E. F. Oeser, E. H. Wolters, A. W. Mierow and Carl F. Scheid, salesmen.

CONE AUTOMATIC MACHINE CO., INC., Windsor, Vt. Booth 345. Cone four spindle automatic lathe. F. L. Cone, president; Raymond Cone, superintendent; John H. Glover, Chicago representative.

CONSOLIDATED MACHINE TOOL CORPORATION OF AMERICA, Rochester, N. Y. Booth 269. Colburn D-4 heavy duty drill press; Colburn 48-in. heavy duty boring and turning mill; Modern automatic roll grinder; Modern collapsible taps, die heads and cutters; Modern threading machine; Newton continuous milling machine; Ingle tooth rounding machine. Alfred Arosch, chief engineer; C. R. Williams, sales department.

COOPER-HEWITT ELECTRIC CO., Hoboken, N. J. Booth 393. Installation of nearly 100 Cooper-Hewitt Work-light lamps illuminating entire section where operating machinery is being shown; lamps in detail; industrial engineering data; typical layouts for lighting of metal working plants; photographs showing Cooper-Hewitt installations by industrial concerns.

F. G. PAYSON
General Manager
Logansport Machine Co., Logansport, Ind.

T. H. NELSON
Ludlum Steel Co.
Watervliet, N. Y.

F. FISHER
Chicago Branch Manager
McCrosky Tool Corporation
Meadville, Pa.

F. R. SCHUBERT
Vice-President
McGill Metal Co.
Valparaiso, Ind.

J. R. PATTERSON
Manager
Adamite Sales
Mackintosh-Hemphill Co., Pittsburgh

W. B. BARSTOW
Sales Manager
Mahr Mfg. Co.
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J. R. PORTER
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Marshall & Huschart
Machinery Co.
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W. E. WILLIAMS
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Vice-President
Midvale Co.
Nicetown
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J. GORDON BARR
Chicago
Representative
Morse Twist Drill &
Machine Co.
New Bedford, Mass.

Charles F. Strebig, sales manager; D. R. Grandy, commercial engineer; H. M. Ferree, assistant commercial engineer; H. T. Braschler and G. R. Clover, Chicago; C. R. Cloun, Detroit; W. W. Becky, Cincinnati.

CRANKSHAFT MACHINE CO., Jackson, Mich. Booths 358-363. Melling crankshaft lathe turning all four pins at one operation. D. G. Kimball, president; N. R. Townley, vice-president; L. E. Broughton, treasurer and manager; R. G. Williams, Western sales manager; E. W. Ilett, Detroit.

CRUCIBLE STEEL CO., OF AMERICA, New York. Booths 22-30. Articles and parts made from various grades of steel for purposes, such as airplanes, automobiles, building trades, cutlery, drop forging, edge tools, electrical goods, jewelry, manufacture lumbering machinery, machine tools, metal specialties, mining and smelting, musical instruments, oil machinery, ordnance and munitions, paper machinery, railroad, rubber machinery, scales, shoe and leather machinery, small tools, sporting goods, textile machinery, typewriter manufacture, vault and safe and jail manufacture, watch and clock manufacture, agricultural implements, marine equipment and trucks. F. B. Hufnagel, president; J. A. Mathews and A. T. Galbraith, vice-presidents; C. E. Hill, assistant sales manager; E. P. Gaffney, manager machinery steel division; J. W. Taylor, A. H. Kingsbury, W. E. Pennington, F. A. Lawler, manager Chicago branch; O. F. Carl, J. F. Taylor, J. C. Woodward, A. J. Schatke, A. C. Graham, A. C. Paulson, C. A. Oehring, F. A. Coddington, J. A. Jones, B. F. Reed, manager Milwaukee branch; Burton Brower, R. C. Oram, manager St. Louis branch; W. A. Ellerbrock, T. J. Tamplin, C. G. Werscheid, J. N. Seward, J. E. Hickey, F. Baskerfield, manager railroad department, Chicago; W. Stevenson, R. D. Fletcher, P. J. Connor, C. W. Mayer, manager Indianapolis branch; Roy Slaughter, E. E. Sharp and W. J. Ervin.

CUSHMAN CHUCK CO., Hartford Conn. Booth 385. Cushman chucks. A. L. Whittemore.

D

DANLY MACHINE SPECIALTIES, INC., Chicago. Booths 209 and 213. Danly standard die sets; leader pins—bushings; dowel-pins; die makers' supplies. P. H. Danly, vice-president; A. G. Guilberg, Detroit; A. G. Henry, metallurgist; A. L. Miller, New York; T. R. Swenson, Chicago; A. F. Wallace, Rochester.

DARWIN & MILNER CO., INC., Cleveland. Booth 8.

DAVIS BORING TOOL CO., St. Louis. Booth 396. Expansion boring tools; expansion reamers; expanding blocks; cutter grinding machine. E. E. Davis, president; William Morgan, special representative; J. M. Davie, Cleveland; R. T. Monahan, engineer; V. C. Kloepper, plant engineer; R. A. Braunberger, Chicago; G. H. Cherrington, president Brown & Zortman Machinery Co., Pittsburgh; G. M. Wolff, Williams, Cole & Wolff, Milwaukee; A. J. Heaney, Detroit; J. W. Mull, Indianapolis.

N. C. DAVISON GAS BURNER & WELDING CO., Pittsburgh. Booth 173A. Fuel oil burners for domestic use and for general line of industrial furnaces. Domestic oil burner shown for the first time. N. C. Davison, president; Edward Poor, master mechanic.

DEARBORN CHEMICAL CO., Chicago. Booth 44. No-Ox-Id rust preventive powdered and liquid cleaners. C. I. Loudenback, Detroit; E. M. Converse, director of specialties.

DIAMOND MACHINE CO., Providence, R. I. Booths 262-263. Heavy face grinding machine, 36 in. x 84 in. Alan A. Wood, L. H. Burrill and D. K. Bartlett.

HENRY DISSTON & SONS, INC., Philadelphia. Booths 29 and 33. Metal cutting (cut off) machine in operation; metal band saw in operation; metal cutting saws; hack saws; samples of Disston-made steel and products of Disston-made steel. S. Horace Disston, vice-president; D. W. Jenkins, general sales manager, domestic division; J. C. Forrest, manager metal saw department; H. A. Baxter, manager steel sales; G. J. Ludy, demonstrator; J. L. Dorrington, salesman; C. H. Williams, superintendent of steel works.

H. L. DIXON CO., Pittsburgh. Booth 394-C. Air valves and Mayers vertical sand dampers. H. G. Dixon.

R. J. PRESTON
Manager
Chicago Office
National Acme Co.
Cleveland

E. D. FRANK
National Automatic
Tool Co.
Richmond, Ind.

J. H. FAULKNER
Commonwealth Edison Co., Chicago,
National Electric
Light Association

L. G. NEFF
President
Neff, Kohlbusch &
Bissell, Chicago

E. L. STEINLE
Manager
Machinery Sales
New Britain Machine
Co.
New Britain, Conn.

R. J. CAPLIN
Sales Engineer
Niagara Machine &
Tool Works, Buffalo

H. F. WELCH
General Sales
Manager, Niles Tool
Works Co. Division,
Niles-Bement-Pond
Co., New York

H. J. CUDWORTH
Chicago District
Manager, Machine
Division, Norton Co.
Worcester, Mass.

G. THOMPSON
Chicago District Manager, Wheel Division, Norton Co. Worcester, Mass.

L. A. BARRETT
Sales Engineer Oilgear Co. Milwaukee

E. C. OLIVER
Oliver Instrument Co., Adrian, Mich.

T. Y. OLSEN
General Manager Tinius Olsen Testing Machine Co. Philadelphia

A. H. GOETZ
Sales Manager Peerless Machine Co. Racine, Wis.

R. S. GUTHRIE
General Superintendent People's Gas, Light & Coke Co., Chicago

W. P. KIRK
General Sales Manager, Pratt & Whitney Co. Division, Niles-Bement-Pond Co., New York

E. R. LARSON
District Sales Manager Racine Tool & Machine Co. Racine, Wis.

DONNER STEEL CO., INC., Buffalo. Booth 54. Various die-rolled automotive parts. W. F. Vosmer, vice-president; J. W. Donner, general superintendent; C. A. Cherry, Assistant to vice-president; E. D. Pumphrey, Detroit district manager; H. C. Richardson, Cleveland district manager; M. D. Morris, superintendent forming mill; R. E. Sherlock and W. C. Peterson, metallurgical engineers; F. H. Lammert and T. J. Woods, metallurgical department.

DRESES MACHINE TOOL CO., Cincinnati. Booths 382-383. 5-foot Multi-duty radial drill constant speed motor on arm. Charles E. Gilbert, general manager; J. E. Spaeth, superintendent.

DRIVER-HARRIS CO., Harrison, N. J. Booth 20. Nichrome high temperature resistance alloy for all heat treating applications. Nichrome Grade B for the improvement of cast iron shown for the first time. Harry D. McKinney, general sales manager; George A. Lennox; assistant general sales manager; J. C. Bilek, Chicago; W. E. Blythe, Detroit; H. D. Tietz, Chicago.

DRYING SYSTEMS, INC., Chicago. Booth 187A. Continuous automatic annealing furnace, gas fired; high heat electric smelting furnace with transformer. F. A. Lippert, president; R. E. Lippert, vice-president; T. B. Cram, manager industrial furnace department; G. Bluemel, chief engineer, industrial furnace department; H. R. Fox and C. L. Tortorelli, designers.

DURIRON CO., INC., Dayton, Ohio. Booth 135. Acid-proof equipment for pickling, pipe and fittings, valves, pumps, ejectors or syphons, steam jets, tank outlets, wood tank tie rods, fans, pots, laboratory sinks and drain pipe. W. E. Pratt, sales manager; N. E. Philpot and E. R. Sutler, sales engineers, Chicago.

E

EATON ELECTRIC FURNACE CO., Taunton, Mass. Booth 110A. Electric high speed steel hardening furnace in production service, shown for the first time. John Winter, president; Murray Winter, treasurer; E. I. Hope, secretary.

ECLIPSE FUEL ENGINEERING CO., Rockford, Ill. Booth 180A. Forge-slot to be fired with high pressure gas; forge No. 6, to be equipped with low pressure proportional mixer; rivet heater No. 5, to be equipped with high pressure proportional mixer; boiler, 6 h. p., to be equipped with automatic pump unit and low water fuel cut-off; immersion heater, equipped with thermostatic control for oil tempering; oven furnace, equipped with low pressure proportional mixer and other heating equipment. G. W. McKee, president and general manager; O. M. Olsen, sales manager; K. A. Scharbau, superintendent; E. A. Stoner, service manager; H. O. Hoffman, production manager; L. J. Strohmeyer, advertising manager; O. N. Sellers, manager boiler department; Albert Stadler, blower department; H. F. Wemple, furnace department.

EDLUND MACHINERY CO., INC., Cortland, N. Y. Booth 316. 4B one-spindle drilling machine; 2B column type drilling machine; 2B one-spindle with built-in motor drive; 3B one-spindle with fixture in operation; 2B two-spindle with fixture in operation. John Edlund, president.

ELECTRIC FURNACE CO., Salem, Ohio. Booth 78. Illustrative and descriptive matter regarding T-Grid electric furnaces for heat treating applications. R. F. Benzinger, vice-president and sales manager; C. L. Foster, Chicago; F. J. Peterson, Detroit; S. Floyd Keener, sales representative; F. T. Cope, chief engineer; A. H. Vaughan, engineer.

ELECTRICAL REFRACTORIES CO., East Palestine, Ohio. Booth 24B. Refractory heating element supports used in construction of electrical furnaces, ranges and heating devices. F. E. Owen, president; F. C. Simms, vice-president; C. W. Williams, secretary and treasurer.

ELECTRO-ALLOYS CO., Elyria, Ohio. Booth 138. High temperature castings in form of carburizing boxes, lead pots, recuperators, furnace parts and combustion chambers. J. W. Henry, metallurgist; A. M. Miller, W. J. Hansen and E. C. White, sales representatives; A. L. Garford, president; J. B. Thomas, treasurer; W. C. Whyte, vice-president.

R. E. ELLIS ENGINEERING CO., CHICAGO. Booths 340-356. Machine tools manufactured by the following companies: Equipment Mfg. Co.; Gammons-Holman Co.; Hoefer Mfg. Co.; Logansport Machine Co.; McCrosky Tool Corporation; Metalwood Mfg. Co.; Murchey Machine & Tool Co.; Precision Truing Machine & Tool Co.; Rivett Lathe & Grinder Corporation. Fred Fisher, president; Arthur J. Moore, vice-

F. W. McINTYRE
Vice-President Reed-Prentice Corporation Worcester, Mass.

CARL M. REEVES
Vice-President Reeves Pulley Co. Columbus, Ind.

J. D. CUNNINGHAM
President Republic Flow Meters Co., Chicago

M. E. JOHNSON
Sales Manager Rivett Lathe & Grinder Corporation Boston

C. H. PROCTOR
Plating Expert Roessler & Hasslacher Chemical Co. New York

A. M. MUELLER
General
Sales Manager
Joseph T. Ryerson &
Son., Inc., Chicago

H. G. BENNETT
Salesman
Safety Emery
Wheel Co.
Springfield, Ohio

J. E. KELLY
General
Sales Manager
Simonds Saw & Steel
Co., Fitchburg, Mass.

B. T. SHERK
Western Manager
Skybryte Co.
Cleveland

P. MIGNACCA
Sleeper & Hartley,
Inc.
Worcester, Mass.

president; Ira L. Cameron, treasurer; John H. Sipchen and Herbert Bryce, sales engineers.

LOUIS E. EMERMAN & Co., Chicago. Booth 129. Universal electric hoist, operating on both alternating and direct current, shown for the first time. Sam Danits, sales manager; Louis E. Emerman, president; G. W. McCollum, engineer.

ENDICOTT FORGING & MFG. CO., INC., Endicott, N. Y. Booth 124-B. Steel drop forgings. S. J. Marshall, president; G. B. Reed.

CHARLES ENGELHARD, INC., New York. Booth 16. Indicating and recording pyrometers with double suspended type galvanometers; thermocouples and switching arrangements for use in measuring high temperatures; resistance thermometers; automatic temperature regulating devices; protecting tubes and thermocouple mountings. E. S. Newcomb, district manager; A. M. Wauters, district manager; J. H. Oetjen, factory engineer; W. O. Hebler, general manager.

EQUIPMENT MFG. CO., Worcester, Mass. Booth 344-B. Craftsman continuous rotary milling machine. J. L. Thornton, secretary and manager; A. E. Shepard, chief engineer.

E. L. ESSLEY MACHINERY CO., Chicago. Booths 254-255. Machine tools manufactured by the following firms: American Tool Works, Atlas Press Co., Avey Drilling Machine Co., Barnes Drill Co., Buffalo Forge Co., Jas. Clark, Jr., Electric Co., Cleveland Planer Co., Consolidated Machine Tool Corporation, Diamond Machine Co., Foster Machine Co., Fox Machine Co., High Speed Hammer Co., International Machine Tool Co., Modern Grinder Co., Niagara Machine & Tool Works, Seneca Falls Machine Co., Sidney Machine Tool Co., Sundstrand Machine Tool Co., Whipp Machine Tool Co., Wilmarth & Morman Co. E. L. Essley, president; E. P. Essley, secretary; J. P. Hatton, Gust Olson, Jr., H. A. Lyon, George Burki, C. B. Burns, F. W. Robertson, F. J. Lucas, W. S. Yale, H. J. Rice, W. C. Anderson, P. A. Graunke, N. F. Serbin, Chicago; J. R. McDonald, J. B. Foley, W. A. McDonald, E. J. Burki, W. L. Strickler, Milwaukee; R. E. Chaney, Rock Island; H. J. Volz, Peoria; L. A. Sperry, Grand Rapids, Mich.

EX-CELL-O TOOL & MFG. CO., Detroit. Booths 197 and 201. Internal grinding spindles consisting of belt driven spindles, air turbine driven spindles and drill jig bushings at spindle speed of 65,000 r.p.m.; working demonstration of fit and finish obtained by Allen developing process for fitting grinding spindle bearings; standard drill jib bushings; special length drill jig bushings; general tool details; aircraft and special production parts; high speed precision grinding spindle bearing parts. High speed precision ball bearings fitted by the Allen developing process shown for the first time. N. A. Woodworth, president and general manager; C. R. Alden, manager of sales and research engineering; William F. Wise, special factory representative; E. Richards, demonstrator.

F

FAIRBANKS-MORSE CO., Chicago. Booth 396-C.

FEDERAL MACHINERY SALES CO., Chicago. Booths 310-328. Machine tools manufactured by the following companies: Bardons & Oliver, W. F. & John Barnes Co., Bethel-Player Co., Bilton Machine Tool Co., Carlton Machine Tool Co., Edlund Machinery Co., Inc., Federal Press Co., Fitchburg Grinding Machine Co., Universal Grinding Machine Co., Gardner Machine Co., Geometric Tool Co., G. A. Gray Co., Hall-Will, Inc., Charles L. Jarvis Co., La Salle Tool Co., R. K. LeBlond Machine Tool Co., Sebastian Lathe Co., Smith & Mills Co., Universal Boring Machine Co. and O. S. Walker Co. Charles A. Odegaard, president; Norton A. Booz, secretary and treasurer; H. J. Gaumond, special representative Gardner Machine Tool Co.; B. N. Brockman, special representative R. K. LeBlond Machinery Co.; T. G. Remsen, A. M. Fraser, W. G. Groves, R. G. Erickson, E. H. Lunde, H. V. Hein, E. M. Hartman.

FEDERAL PRESS CO., Elkhart, Ind. Booths 310-328. Open back inclinable presses for sheet metal stamping shown for the first time. J. E. Loshbough, president and general manager; H. M. Beck, secretary and treasurer.

R. Y. FERNER CO., Washington. Booth 285. Société Genevoise products made in Switzerland, including No. 5 high precision locating and jig boring machines, 24 x 32 x 26 in. capacity, in operation, and a 3 x 3 in. capacity machine of the same type used in the making of master plates for watch making; high precision bench micrometer of 8 in. capacity; comparators for checking steel balls, cylindrical and flat pieces and rings. Nos. 1 and 5 jig boring machines,

J. E. MILLS
President and Sales
Manager
Smith & Mills Co.
Cincinnati

IRA H. SPENCER
President
Spencer Turbine Co.
Hartford, Conn.

A. W. SMITH
Chicago Manager
L. S. Starrett Co.
Athol, Mass.

C. W. BLAKESLEE
Sales Manager
N. A. Strand & Co.
Chicago

T. B. LANGDON
Sales Manager
D. A. Stuart & Co.
Chicago

JOHN D. HALL
Chicago District
Manager
Swedish Iron & Steel
Corporation, Brooklyn

L. KLINEDINST
Industrial Division
Timken Roller
Bearing Co.
Canton, Ohio

E. H. WACHS
Secretary
Stocker-Rumely
Wachs Co., Chicago

A. J. SANFORD
Manager of Steel Sales, Timken Roller Bearing Co.
Canton, Ohio

J. H. HORIGAN
Superintendent Shop Order Department
Union Twist Drill Co.
Athol, Mass.

MATT J. HEROLD
General Sales Manager
United States Electrical Tool Co.
Cincinnati

LEON F. MARSH
Mechanical Engineer
Universal Boring Machine Co.
Hudson, Mass.

H. M. GERMAN
Metallurgist
Universal Steel Co.
Bridgeville, Pa.

bench micrometer and test comparator for steel balls, plug gages and thread gages shown for the first time. R. Y. Ferner, United States representative, Société Genevoise d'Instruments de Physique; C. M. Holloway, Chicago; W. S. Ryan, Detroit; John Cetrule, New York; Charles Ameel and M. Stucki, operators and demonstrators.

FERRY CAP AND SET SCREW Co., Cleveland. Booth 385. Caps and set screws. H. D. North.

A. FINKL & SONS Co., Chicago. Booth 21. Drop forge supplies. Charles E. Finkl, general manager; William Finkl, metallurgical engineer; E. H. Graham, Detroit; T. P. Wallace, Cincinnati; W. L. Goodrich, New England district sales manager; I. N. Curly, Boston; W. H. Rieger, Pittsburgh.

FIRTH-STERLING STEEL Co., McKeesport, Pa. Booths 104 and 108. High speed carbon and alloy tool steels; samples of raw materials used; various processes of manufacture; complete working model in operation of a 3-ton electric furnace from which heats will be poured three or four times daily. Edwin T. Jackson, A. E. Barker, G. J. Bauer, D. G. Clark, C. O. Ericke, L. Gerald Firth, R. H. Hallagan, E. P. Hedges, C. E. Hughes, Alan Jackman, D. E. Jackman, D. E. Jackman, Jr., E. S. Jackman, G. A. Jacobs, T. A. Larecy, W. J. MacFarland, Al Mattson, F. N. Mead, H. I. Moore, William Ely Nelson, W. A. Nungester, I. Olson, L. S. Russell, W. C. Royce and J. A. Wotan.

FITCHBURG GRINDING MACHINE Co., Fitchburg, Mass. Booth 328. No. 2 Bath Universal cutter and tool grinder; valve seat grinder; and semi-automatic grinder. Robert Gould.

FLATHER Co., Nashua, N. H. Booth 276-A. Geared head and cone head engine lathes. H. L. Flather.

FOOTE BROTHERS GEAR & MACHINE Co., Chicago. Booth 397. Spin-worms and herringbone speed reducers, combination spiral-worm reduction set, industrial gears and double-worm gear reduction unit. Double-worm reduction unit shown for the first time. F. A. Emmons, sales manager; C. G. Wennerstrom, W. A. Goellner and H. G. Davis, sales engineers.

FOOTE-BURT Co., Cleveland. Booths 217-240. Footburt Sipp type, quick change speed sensitive drilling machines. T. H. Doan, vice-president; R. E. Delamater.

J. B. FORD Co., Wyandotte, Mich. Booth 214. Wyandotte metal cleaners. B. N. Goodell, manager industrial department; C. S. Lee, assistant advertising manager; C. R. Beaubien and C. S. Thompkins, industrial department; P. V. Ward, Chicago.

FOSTER MACHINE Co., Elkhart, Ind. Booth 252. No. 3 Foster alloy steel head screw machine with standard belt motor drive; new style 1-B Foster universal turret lathe with silent chain, overhead motor drive; new style 2-B Foster universal turret lathe with built-in motor drive. W. H. Foster, president; W. T. Kough, superintendent; R. E. Horner, secretary; H. J. Weaver, assistant sales manager; H. E. Dillon, chief engineer; Carl Moser, Chicago.

FOX MACHINE Co., Jackson, Mich. Booth 257. No. 14-AC multiple spindle drilling machine; No. 12-BC multiple spindle tapping machine performing satisfactory tapping of blind holes; 6-ton Superflex power press doing shaft straightening work; 3-ton Superflex power press doing light push broaching work. H. W. Fox, vice-president; M. R. Fox, sales manager; A. A. Riddell, chief engineer; C. A. Bullard, sales engineer; Frank Slater, sales engineer.

G

GAIRING TOOL Co., Detroit. Booth 205. Counterbores, spotfacers and core drills. Offset spotfacing head shown for the first time. George Landry, sales engineer; C. B. Cole, Illinois representative; B. O'Meara, advertising manager; H. D. Strelluf, salesman; E. Gairing, president; W. B. Leonard, factory representative; Irvin C. Scovill, Ohio representative.

GALLMEYER & LIVINGSTON Co., Grand Rapids, Mich. Booth 372. Motor driven universal cutter and tool grinders; motor driven drill grinders; motor driven tap grinders. B. C. Saunders, secretary and sales manager; H. L. Saunders, Chicago; J. DeKoning, mechanical engineer.

GAMMONS-HOLMAN Co., Manchester, Conn. Booth 340-B. Taper pin reamers; helical chucking reamers and end mills; parobolic expansion hand reamers; special reamers. William B. Gammons, president.

GARDNER MACHINE Co., Beloit, Wis. Booths 310-328. No. 27 fully Oilgear operated, double spindle grinder; No. 1 Oilgear surface grinder; No. 79 72-in. disk grinder with vertical motor; No. 2 standard motor driven disk grinder; 18-in. grinder with vertical motor; No. 3-D double spindle polishing lathe; No. 3 polishing lathe. The fully Oilgear operated grinder shown for the first time. L. W. Thompson, president; F. E. Gardner, vice-president; W. B. Leishman, treasurer; H. J. Gaumond, sales engineer; D. C. Hughes, chief engineer; B. H. Pratt, superintendent of service.

W. GATERMAN MFG. Co., Manitowoc, Wis. Booth 349-A. Nos. 4 and 8 tapping machines. F. H. Kind, superintendent; William Gaterman, president; E. Gaterman, secretary-treasurer.

GATHMANN ENGINEERING Co., Baltimore. Booths 10 and 11. Methods and molds for producing sound steel ingots; model ingot molds in operation, visually demonstrating the solidification of crystalline material; split ingots showing condition of interior structure. Emil Gathmann, president, and Mark Gathmann, George A. Dornin and E. A. Whitworth, sales engineers.

GENERAL ALLOYS Co., Boston. Booths 3 and 4. Q-Alloy carburizing boxes, cyanide and lead pots, retorts, muffles, glass dies, conveyor chains, enamel burning racks; ore roasting furnace parts, oil-still parts, cyanide dipping baskets, sheet and cast pans and trays, hearth plates, furnace parts, miscellaneous Q-Alloy casting covering entire heat treating field. H. H. Harris, president; E. J. Van Stone, vice-president; W. K. Leach, A. L. Grinell, L. J. McCarty, H. G. Chase, R. M. Kirk and A. D. Heath.

GENERAL ELECTRIC Co., Schenectady, N. Y. Booths 91 and 95. Electric furnaces and electrical equipment. C. T. McLoughlin.

GEOMETRIC TOOL Co., New Haven, Conn. Booth 325. Self-opening and adjustable die heads, self-opening and adjustable rotary die heads; solid adjustable die heads; adjustable collapsing taps; adjustable collapsing rotary taps; solid adjustable taps; chamfer grinding fixtures; Geometric threading machines; adjustable hollow milling tools; KD rotary die heads and class S taps shown for the first time. G. A. Denison, sales manager; F. W. Gowrie, service engineer, and W. Paul Eddy, Jr., metallurgist.

WILLIAM D. GIBSON Co., Chicago. Booth 72. Gibson springs. E. W. Stewart.

GIDDINGS & LEWIS MACHINE TOOL Co., Fond du Lac, Wis. Booths 217-240. No. 45 horizontal boring, drilling and milling machine; No. 11 fully automatic internal grinder Teromatic. H. B. Kraut, vice-president and general manager; C. Gebuhr, R. H. McCormick, A. E. Ulrich, G. A. Pabst, K. F. Gallimore, R. M. Woytych, W. E. Rutz, J. Eppler, J. Yungwirth, F. W. Krueger, William Eilers, L. Kimble.

GILBERT & BARKER MFG. Co., Springfield, Mass. Booth 131. Furnaces and gas and oil burners. Salt bath furnaces shown for the first time. M. K. Epstein, sales manager industrial division; S. S. Callner, Chicago distributer.

J. E. GILBERT GRINDER Co., Milwaukee. Booth 381-A. Portable precision grinders. E. N. Detzer, special representative; C. J. Davidson, president; J. E. Gilbert, secretary.

GISHOLT MACHINE Co., Madison, Wis. Booths 270-275. 4L turret lathe with fixed center turret; 3L turret lathe with cross feeding turret; 4B universal turret lathe; Simplimatic precision balancing machine. Universal precision balancing machines on pulleys shown for the first time. W. J. Hannum, sales manager; E. S. Chapman, assistant sales manager; A. R. Engler, service manager; E. B. Verner, George H. Johnson, R. E. MacCartney, J. H. Nebel, F. M. Long.

GITS BROTHERS MFG. Co., Chicago. Booth 389. Oil cups for all industrial purposes and automotive chassis lubricators. R. J. Gits, president; Q. T. Morgan, general manager; Frank Zeman, sales manager.

GODDARD & GODDARD Co., Detroit. Booth 211. Working exhibit of production milling cutters of both profile and formed type; high production cutters adapted for railroad work. Sectional inserted blade profiling cutter for use in profiling locomotive main and side rods shown for the first time. A. N. Goddard, president; C. S. Goddard, general sales manager; C. H. Wallace, special railroad representative and demonstrator, and H. S. Huncke, Illinois, Wisconsin and Iowa representative; E. E. Teerner, Cincinnati; R. T. Rice, Cleveland and Pittsburgh; William Fritz, milling machine operator.

CLAUD S. GORDON Co., Chicago. Booth 186. Pyrometer protecting tubes; pyrometer thermo couples; heat treaters' service magnet; protecting cabinets; switches and other accessories. Service magnet shown for the first time. Claud S. Gordon, president and manager, and A. W. Anderson, vice-president and superintendent.

GOSS & DELEEUW MACHINE Co., New Britain, Conn. Booth 341. Automatic chucking machine.

GOULD & EBERHARDT, Newark, N. J. Booths 217-240. 16HS manufacturing hobbing machine cutting spur gears; 32-in. Invincible shaper, with latest improvements, cutting die blocks. Frederick G. Eberhardt, James Craig, John Allwood.

G. A. GRAY Co., Cincinnati. Booths 310-328. 36 in. x 36 in. x 10 ft. Gray open side maximum service planer in operation with single shift power rapid traverse to all heads; twin-purpose taper gibs and abutment apron, equipped with Westinghouse high speed variable voltage drive. Variable voltage high speed drive running directly on alternating current shown for the first time. August Marx, vice-president and general manager; Tell Berna, sales manager; Phillip Leisinger, planer superintendent.

GREENFIELD TAP & DIE CORPORATION, Greenfield, Mass. Booth 401. No. 28 Hydroil internal grinder; ground thread taps; plain and thread plugs; ring gages. No. 28 Hydroil grinder shown for the first time. R. B. Hubbell, manager machine tool department; A. M. Drake, chief engineer; E. J. Bryant, manager gage department; C. C. Zeigler, manager Chicago store and warehouse; F. M. Bettes, manager railroad department.

H

GEORGE J. HAGAN Co., Pittsburgh. Booths 106-107. Full automatic charging and discharging furnace of the rotary type electrically heated, in operation; photographs and information relative to heating equipment of coal, gas, oil or electric type. R. E. Tally, president; H. C. Hanner, treasurer; V. A. Hain, Chicago; J. Sandberg, Detroit; J. L. Edwards, C. F. Cone, and H. D. Dauch, engineers.

HALCOMB STEEL Co., Syracuse, N. Y. Booths 27-31. Crucible and electric tool and alloy steels. H. A. Pardee, general manager; H. J. Stagg, assistant general manager; M. P. Spencer, assistant sales manager; S. C. Spalding, metallurgist; J. H. Hinkley, Chicago; Arthur Schroeder, Detroit; J. F. Kirwan, Cleveland; T. F. Wood, Syracuse; F. W. Ross, New York; Leslie D. Hawkridge and H. D. Evans, New England representatives; J. T. Leyden, R. W. Rogers, C. A. Cooper, C. W. Wood and H. W. Jerry.

HALL-WILL, INC., Erie, Pa. Booth 321. New type threaders; Red-E-Hall portable pipe threader. L. S. Hall, president and general manager; G. C. Hay, sales manager.

HAMMOND MFG. Co., Cleveland. Booths 217-240. 4-ft. high speed radial drilling and tapping machine with automatic releasing clutch; pedestal type drilling and tapping machine with automatic releasing clutch, with 10-in. overhang; cabinet base ball bearing, polishing and buffing machine, with self-contained motor drive, and hand operated braking and locking device. W. D. Buss, vice-president and manager; Walter Osto, demonstrator.

HANDE WRENCH SALES Co., Chicago. Booth 129. Monkey, hand and pipe wrenches. F. M. Luther, Jr., president; W. M. Craig, secretary and treasurer; George E. Hemphill, president Hande Wrench Co.; A. G. Seabury, vice-president, Hande Wrench Co.

HANSON-WHITNEY MACHINE Co., Hartford, Conn. Booth 373. Universal semi-automatic thread milling machine; universal vertical tool and die shaping machine for machining dies and other tool work; rapid precision centering machine; sharpening machine for taps, hobs, reamers, milling cutters, etc; universal measuring machine of new design; taps, thread gages, hobs, thread rolling dies, etc. J. W. Johnson, sales engineer; C. A. Laruidsen, demonstrator.

HEALD MACHINE Co., Worcester, Mass. Booths 347 and 351. Size-matic internal grinding machine, fully automatic, in operation except loading; automatic rotary surface grinding machine, entirely automatic; special cylinder grinding machine for cross compound air compressors. All machines shown for the first time. James N. Heald, general manager; S. T. Massey, sales manager; O. A. Johnson, demonstrator, Chicago; M. F. McCormick, Chicago.

HEAT TREATING SUPPLY Co., Sandusky, Ohio. Booth 168. Sementite carburizing compounds and samples of steel parts carburized with Sementite. Edwin L. Smith, manager.

HEIM GRINDER Co., Danbury, Conn. Booth 399. Heim centerless grinder. F. M. Angevin, general manager; Clement Booth, works manager; R. Krametz and C. Previdi.

HEPPENSTALL FORGE & KNIFE Co., Pittsburgh. Booth 139. Pictures of plants and various products exhibited by means of an electrically operated display. C. W. Heppenstall, S. B. Heppenstall, A. L. Wurster, A. J. Porter, Jr., G. I. Allen, Frank Moyer, George Desauteis, D. Stewart, I. E. Walton, B. B. Weinberg, R. B. Heppenstall, J. P. Bindyke, J. A. Succop.

HEVI DUTY ELECTRIC Co., Milwaukee. Booth 99. New and improved rotary drum-type furnace for continuous heat treatment of small parts; two new types of tool room furnaces, one in operation, the other furnace being equipped with a movable sill, demonstrating ease of loading heavy pieces; laboratory furnaces and photographs of recent installations. E. L. Smalley, R. L. Corbett, T. B. Bechtel, F. A. Hansen, C. H. Stevenson.

HIGH POWER TOOL CORPORATION, Jackson, Mich. Booths 358-363.

HIGH SPEED HAMMER Co., INC., Rochester, N. Y. Booth 261. High speed riveting hammers and a drill press. No. 6B hammer shown for the first time. H. A. Moore, field manager; D. Sutter and H. M. Stark, salesmen.

HOEFFER MFG. Co., Freeport, Ill. Booth 344-A. Drillers and auxiliary heads. C. A. Hoeffer.

FLOYD ROSE
Vice-President
Vanadium-Alloys Steel Co.
Latrobe, Pa.

ANCEL ST. JOHN
Consulting Physicist
Wappler Electric Co., Inc., Long Island City, N. Y.

F. H. LUTZOW
President
Western Bearings Co.
Chicago

A. ORAM FULTON
President
Wheelock, Lovejoy & Co., Inc.
Cambridge, Mass.

G. E. HIEBER
Whipp Machine Tool Co.
Sidney, Ohio

CHARLES H. SLAUGHTER
Sales Manager
Wilmarth & Morman Co.
Grand Rapids, Mich.

MILTON A. SCHREINER
Wilson-Maculen Co., Inc.
New York

C. H. BEACH
Wisconsin Electric Co.
Racine, Wis.

G. F. ZIV
President
Ziv Steel & Wire Co.
Chicago

AXEL H. ENGSTROM
Sales Manager
Botfield Refractories Co.
Philadelphia

HOLCROFT & Co., Detroit. Booth 98. Working exhibits of the company's products, data, drawings, photographs and information. C. T. Holcroft, R. T. Cadwell, C. L. Joy, C. H. Martin, H. L. Ritts and A. Ruckstahl, H. M. Smith.

HOOVER STEEL BALL Co., Ann Arbor, Mich. Booth 25. Steel, brass, bronze and stainless steel balls, taper roller bearings; spiral roller bearings. Spiral type roller bearings for automobiles and industrial applications shown for the first time. H. D. Runciman, secretary and general manager; C. W. Lighthall, factory manager; S. A. Strickland, manager of bearings division; H. G. Freeland, metallurgist; H. T. Morton, Jr., assistant metallurgist.

HOSKINS MFG. Co., Detroit. Booth 87. Electric tool room furnace with automatic temperature control; miniature electric train operated by the electromotive force generated by Chromel thermocouples and a line of pyrometers. W. D. Little, sales manager; Charles S. Kinnison, advertising manager; W. A. Gatward, chief engineer; C. F. Busse, Chicago.

E. F. HOUGHTON & Co., Philadelphia. Booths 115 and 119. Vim leather belting and Vim leather packings; electric pots for liquid heat and drawing temperature. J. C. Bentley.

ILLINOIS TOOL WORKS, Chicago. Booth 57. Milling cutters; reamers; broaches; special form tools; ground and unground hobs for gears, splines, ratchets, worms and thread milling; testing instruments for hobs and gears; complete line of Shakeproof lock washers and locking wire terminals. J. J. Hotz, Indiana representative; E. E. Valy, Chicago; D. M. Murphy, Detroit; R. P. Liner, factory representative; S. O. Bjornberg; J. M. Gribbie, sales manager Shakeproof Lock Washer Co.; H. J. Land, factory representative.

I

INTERNATIONAL MACHINE TOOL Co., Indianapolis. Booths 258 and 259. 26 in., 12¼ in. bore machine; 18 in., 3½ in. bore machine, both motor driven. O. B. Iles, president; T. P. Dickinson, secretary and treasurer; Roy Hunter, D. J. Cosner and V. V. Caywood.

INTERNATIONAL NICKEL Co., New York. Booths 38 and 39. Commercial forms and examples of applications of nickel and its alloys; Attract-o-scope, showing pictures of applications of nickel steel and other nickel alloys; technical and trade literature on nickel and its alloys. F. S. Jordan, sales manager; R. A. Wheeler, nickel department; A. J. Wadhams, manager development and research department; P. D. Merica, director of research; R. L. Suhl, development engineer; T. H. Wickenden, Charles McKnight, Jr., J. S. Vanick, R. G. Waltenberg and D. M. Houston, development and research department.

INTERSTATE IRON & STEEL Co., Chicago. Booths 122 and 123. Small working model of a locomotive with attention called to the value of alloy steel in the small working parts such as the crank pins, piston rods, frame rods, frame bolts and spring hanger arms; new locomotive parts made of alloy steel and parts made of iron and mild steel which have failed in service; section of a locomotive frame so arranged as to show the difference in elongation between iron and alloy steel bolts; Olsen bending machine to illustrate the difference in bending moment between iron bolts and alloy steel bolts in locomotives. W. J. MacKenzie, vice-president in charge of metallurgy; E. Larned, chief metallurgist; L. L. Solger, assistant metallurgist, and W. H. C. Carhart, assistant metallurgist.

IRON AGE PUBLISHING Co., New York. Booth 2. Copies of THE IRON AGE and reprints of this section of the paper. Rest room. Fritz J. Frank, president; W. W. Macon, managing editor; E. C. Cone and Ralph E. Miller, editorial staff New York; Rogers A. Fiske, Chicago resident editor; C. S. Baur, general advertising manager, and the following district advertising managers: H. E. Barr, Boston; Emerson Findley, Cleveland; Don G. Gardner, Cincinnati; B. L. Herman, Buffalo; Charles Lundberg, Philadelphia; Pierce Lewis, Detroit; C. H. Ober, New York; W. B. Robinson, Pittsburgh; W. C. Sweetser, New York; Dwight C. Warren, Hartford, Conn.; F. S. Wayne, Chicago; A. H. Dix, manager Reader Service Department.

J

CHARLES L. JARVIS Co., Gildersleeve, Conn. Booths 310-328. Tapping devices, built-in tapping devices, quick change chucks and collets, stud setters and screw drivers. Multiple tapping device shown for the first time. M. N. Jarvis, president, and F. C. Barker, secretary.

JESSOP STEEL Co., Washington, Pa. Booth 184. Specimen tool steel bars, sheets and plates, various grades. Specimens of finished products from tool steel bars and sheets. Swedish iron exhibit. S. A. Grayson, president and general manager; F. T. H. Youngman, secretary and treasurer; R. K. Greaves, manager of Detroit branch; Schaffran Dawson, Chicago office; E. V. Vogeley, manager of New York branch; A. G. Lambert, Canadian office, Hamilton; V. M. Wellman, manager of Cleveland branch; J. M. Curley, New England representative, Cambridge, Mass.; W. J. Frederick, representative Cincinnati branch, and A. C. Leete, Rochester representative.

JONES & LAMSON MACHINE Co., Springfield, Vt. Booths 405-406-407. Hartness flat turret lathe, 17-in. chuck model; Hartness flat turret lathe, 4 x 30-in. bar model; two Fay automatic lathes; Hartness screw thread Comparator; Hartness automatic dies and Flanders ground thread taps. H. S. Beal, assistant general manager; J. C. Price, Chicago representative; F. L. Watkins, Detroit representative; J. L. Reilly, Indianapolis representative; C. S. Seaver, Ohio representative, and G. S. McClellan, Milwaukee representative.

JONES & LAUGHLIN STEEL CORPORATION, Pittsburgh. Booth 63. Jalcase steel, hot and cold finished, parts manufactured therefrom and other cold finished steels. Jalcase steel shown for the first time. W. B. Todd, manager of sales cold finished department; J. D. Allen, R. W. Light and G. C. King, all of the cold finished department; R. J. Stayman, manager Chicago office; M. A. Blessing, assistant Chicago office, and A. A. Wagner, assistant manager hot rolled sales department.

K

KANE & ROACH, Syracuse, N. Y. Booth 392-B. No. D-8 roll core wire straightener direct connected to electric motor 2 hp. Howard W. Kane, director of sales.

KEARNEY & TRECKER CORPORATION, Milwaukee. Booths 333 and 333A. No. 3B universal and 4B plain milling machine in operation, both shown for the first time. Theodore Trecker, president; E. J. Kearney, secretary and treasurer; William James, works manager; George L. Erwin, Jr., sales manager; M. J. Schmitt, manager Milwaukee sales; Martin J. Luther, manager Chicago branch; R. W. Shaw, assistant manager Chicago branch; William Mirgiler, Frank Riffle and C. Hochmuth.

KELLER MECHANICAL ENGINEERING CORPORATION, 70 Washington Street, Brooklyn. Booths 217-240. One type BL Keller universal die and toolroom machine, one R-6 Keller cutter and radius grinder and BK-1 and BK-3 flexible shaft grinders. S. A. Keller, treasurer; Jules Dierckx, vice-president and sales manager; A. J. Benson, Leon Desautels, P. D. Brown, G. I. Croll.

KELLY REAMER Co., West Seventy-third Street, Cleveland. Booth 187. Complete line of boring and reaming tools for industrial and railroad manufacturing and repair work, including single point, two point and block unit multiple blades and extension block unit tools for boring and reaming. Line of four bladed roughing cutters and multiple blade finishing reamers and line of railroad manufacturing and repair tools shown for the first time. E. W. Putnam, general manager; F. S. Hartwell, consulting engineer, and C. B. Cole, Chicago representative.

KEMPSMITH MFG. CO., Milwaukee. Booth 391. No. 2 universal Maximiller. Represented by: Messrs. Goetz, Wollaeger, Radermaker, Rowinski, Czerwonky, Steck, and Nieman.

KEYSTONE LUBRICATING CO., Philadelphia. Booth 17. A line-shaft and crank motion, the bearings of which are connected to the Keystone safety lubricating system. New accessories, including the pressure tell-tale and tell-tale alarm system; photographs illustrating the application of the Keystone safety lubricator, also a demonstration of Keystone grease for speed reduction units and silent chain drives and a graph showing the comparative efficiency of Keystone liquid grease vs. motor oil for the lubrication of electric motor bearings. J. H. Conlon, Milwaukee; P. Cassady, Western manager, Chicago; G. W. Hall, Pittsburgh district manager; M. C. Schwenk, Detroit; P. J. Nash, Chicago; T. B. Little, Pittsburgh; Vic. Berguson, Cleveland; and F. D. Street, sales engineer department, Philadelphia.

KING REFRACTORIES CO., INC., Detroit. Booth 137-B.

KINGSBURY MACHINE CO., Keene, N. H. Booth 283A. Single spindle vertical floor type semi-automatic drilling machine arranged for cross drilling pins and universal table type drilling machine on which standard direct motor driven drill heads may be mounted in various positions. Motor driven tapping head in which spindle is reversed through an automatically controlled clutch built into the head shown for the first time. Edward J. Kingsbury, manager, and Gunnar Swahnberg, engineer.

KLOSTER STEEL CORPORATION, Chicago. Booth 69. Swedish steel of every description, including tool steels, hollow and solid, drill steels, cutlery steel, ball bearing steel, magnet steel, file steel, band saw steel, razor blade steel, rolled wire, clock spring steel, skate steel, hot and cold rolled strip steel, band iron, rolled figured steel, beveled shoe knife steel and Swedish iron. Swed-oil non shrinking oil hardening steel and Kloster Swedish steels of every description shown for the first time. Einar Lindeblad, president and general manager; C. A. Palmgren, vice-president; Clarence Palmgren, sales representative.

W. B. KNIGHT MACHINERY CO., St. Louis. Booth 374. New No. 4 Knight vertical miller shown for the first time. W. B. Knight, Jr., factory superintendent, and John M. Davie, Cleveland representative.

KROPP FORGE CO., 5301 West Roosevelt Road, Chicago. Booth 136. Small and large hammered forgings, small and large drop forgings, flanges and rivet sets. Rivet sets shown for the first time. C. A. Kropp, president; R. A. Kropp, vice-president; C. F. Johnson, secretary; D. W. Devine, salesman; and J. N. Gibson, superintendent drop forge department.

L

LANDIS MACHINE CO., Waynesboro, Pa. Booths 217-240. New ½-in. Landis double head lead-screw threading machine with geared headstock, new type 6-in. Landis pipe threading and cutting off machine, "Lanco" heads, rotary type, for operation to automatic and hand operated threading machines, "Landmatic" heads, stationary type, for application to turret lathes and hand operated screw machines, and Victor collapsible taps. C. N. Kirkpatrick, sales manager; R. G. Mumma, manager Victor plant; M. M. Lutz and H. C. Stevens, Chicago representatives.

LANDIS TOOL CO., Waynesboro, Pa. Booth 337. Plain hydraulic grinder with power in-feed to wheel head. Hydraulic crank pin grinder. R. F. Ingram, sales manager; S. S. Shoemaker, sales engineer; R. E. Forthman, special representative; E. E. Warn, Chicago representative; and J. L. Welsh, demonstrator.

LASALLE TOOL CO., LaSalle, Ill. Booth 317. No. 1 plain and surface grinder, motor driven; No. 2 automatic surface grinder, motor driven; American drill grinder, motor driven. F. S. Knowles, president; A. S. Johnson, works manager.

R. K. LEBLOND MACHINE TOOL CO., Cincinnati. Booths 310-328. No. 16 automatic lathe, motor driven; No. 9 Multicut lathe, motor driven; 21-in. engine lathe, motor driven; 30-in. engine lathe, motor driven; 11-in. rapid production lathe, motor driven; No. 3 geared-head plain milling machine, motor driven. Cutter grinder, motor driven. H. C. Pierce, secretary and sales manager; B. Brockman, Chicago representative; Charles Carr, demonstrator.

LEEDS & NORTHRUP CO., 4901 Stanton Avenue, Philadelphia. Booths 89, 93 and 97. "Hump" electric hardening furnaces, "Homo" electric drawing furnaces and pyrometers for indicating, recording and controlling temperature. Henry Brewer, assistant sales manager pyrometer division; G. W. Tall, Jr., assistant sales manager furnace division; A. E. Tarr, district manager furnace division; P. H. Taylor, district manager pyrometer division, and M. B. Fisher, Jordan Korp, T. C. Smith, W. D. Trueblood, Jr., and H. S. Vecella, sales representatives.

LEHMANN MACHINE CO., Chouteau and Grand Avenues, St. Louis. Booth 312. Lehmann lathe, 22 in. x 11 ft., 16 speed head, arranged for motor drive, complete with standard equipment and with improved taper attachment fitted. Paul Lehmann, president.

E. LEITZ, INC., 60 East Tenth Street, New York. Booth 1. Improved 1926 model Leitz micro-metallograph utilizing oblique and conical stop illumination, universal microscope equipped with numerous interchangeable mechanical and optical parts and model MOP combination microscope for the examination of metal specimens under ordinary and polarized light. Guthrie's research equipment for grinding and polishing metal specimens shown for the first time. R. Tvestmann and W. Zieler.

LELAND-GIFFORD CO., Worcester, Mass. Booth 357. One 12-in., one spindle, motor spindle drill, floor type; one No. 2, 14-in., one spindle, motor spindle, sensitive drilling machine complete with ball bearing back gear unit; one No. 3, 24-in., one spindle, motor spindle with ball bearing back gear unit; one No. 1, 12-in., two spindle, floor type, belt drive with No. 1 ball bearing tapper; one No. 2, 14-in., three spindle belt drive with power feed on left hand spindle, a No. 5 ball-bearing tapper on right hand spindle; one No. 3, 24-in., one spindle belt drive with ball bearing back gear and power feed; one No. 2, 14-in., two spindle belt drive with two power feeds, operating on a production basis. S. B. Dowd, sales manager; S. Nikoloff, vice-president; C. H. James, manager Chicago office; E. A. Heidlinger, manager Detroit office; B. J. Riordan and W. Fors, Detroit office; J. R. Hoover, Chicago office; and A. H. Anderson, manager Cleveland office.

LIBERTY MACHINE TOOL COMPANY, Hamilton, Ohio. Booths 370-371. One 36-in. x 36-in. x 12-ft. Liberty double housing planer, with two heads on cross rail and two side heads, and arranged for reversing motor drive. Jewett Millikin, manager; E. H. Wachs, sales; Albert Meyers, demonstrator.

LINDBERG STEEL TREATING CO., Chicago. Booth 64A. Photographs and descriptions of heat treating plant and tools as treated in plant. Photographs of high speed steel hardening process; tempering of intricate tools and dies; heat treating; carburizing; annealing; cyanide and color hardening. A. N. Lindberg, president and general manager; H. E. Lindberg and L. A. Lindberg.

LINK BELT CO., Chicago. Booth 404. Silent chain drives and silent chain Paradox. J. S. Watson, general manager, Dodge Works and drive chain department; G. W. Ostrand, manager of merchandise department, Chicago plant; J. S. Holl advertising manager; Ralph Dyson, manager stock drive division of drive chain department; and H. F. Weber, manager Chicago sales, silent chain department.

J. A. SCOTT
Secretary and General Manager
Brown Lynch Scott Co.
Monmouth, Ill.

R. S. DRYSDALE
Cutting Oil Department
Sun Oil Co.
Philadelphia

C. E. SCHOLER
Salesman
Ruemelin Mfg. Co.
Minneapolis

E. R. SMITH
General Manager
Seneca Falls Machine Co.
Seneca Falls, N. Y.

PHILIP M. GUBA
New York District Sales Manager
Donner Steel Co.
Buffalo, N. Y.

LODGE & SHIPLEY MACHINE TOOL CO., Cincinnati. Booths 217-240. 14-in. x 6-ft. selective head tool-room lathe with universal relieving attachment. J. W. Carrel, vice-president and general manager; H. J. Breitenbach, assistant general manager; Fred Schoeffler, superintendent; R. C. Johnston, tool supervisor; Fred Albrecht, sales manager; T. C. Stephens and J. N. Stephens.

LOGANSPORT MACHINE CO., Logansport, Ind. Booth 356B. Air-operated chuck and labor-saving devices. Frank G. Payson, general manager, and A. J. Moore, vice-president, R. E. Ellis Engineering Co., Chicago representative.

LOSHBOUGH-JORDAN TOOL & MACHINE CO., Elkhart, Ind. Booth 375. Power punch press.

LUDLUM STEEL CO., Watervliet, N. Y. Booths 142-143. Tool, high-speed, special alloy and "Silcrome" valve steels, "Delhi" rustless and non-corrosive iron and steel and their applications in industry as shown by typical products and illustrated by slides. C. B. Templeton, T. H. Nelson and W. J. Fitzgerald, Watervliet office; W. L. Weaver, Albany; P. E. Floyd, G. L. Hulben and L. D. Burr, Chicago office; T. C. Sherman, P. H. Thurston and W. Kinsey, Cleveland office, and J. E. Polhemus, H. E. Askew, Jr., H. W. Spiegel and J. J. Cruice, Detroit office.

M

MACINTOSH-HEMPHILL CO., Pittsburgh. Booth 130. Adamite products including forming dies for the cold working and forming of light steel plate, especially work applying to the automotive industry; permanent molds for aluminum castings; skelp bending dies for bending of hot skelp bar to tubular form preparatory to the actual welding of pipe; tube mill sizing rolls for the hot sizing of finished pipe and tubes; roll dies, for rolling shovel steel, hoe plates, fork tines, etc.; rolling mill plugs for seamless tube mills; guides for merchant, bar and rod mills; gears; hammer dies; blast furnace pig machine wheels; drawing rings; aluminum melting pots. J. R. Patterson, manager of Adamite sales; J. M. Lewis, Adamite sales department.

MADISON-KIPP CORPORATION, Madison, Wis. Booth 210. A complete line of Madison-Kipp machine-tool lubricators, displaying sizes from 4 outlets up to 104 outlets per lubricator. All lubricators operated by an electric motor and mounted on a single stand so as to display not only the different sizes, but the different methods of attaching to machine tools, and the various methods of driving the lubricators. A. T. Lillegren, sales manager; J. A. Courter, eastern sales manager; W. G. Coles, chief engineer, and F. R. Clark, sales department.

MAHR MFG. CO., Minneapolis. Booth 169. Electric and oil-operated tool furnace, "Mahrvel" triple-atomizing low-pressure burners, calorizors, blowers and automatic shut-off valves. Triple-atomizing low-pressure burners shown for the first time. W. G. Barstow, sales manager; Ben G. Harmon, Chicago district manager; A. E. Stenzel, Detroit district manager; C. W. Rudolph, Chicago representative, and R. M. Hortvelt, engineering department.

MANNING, MAXWELL & MOORE, INC., New York and Chicago. Booths 382 to 396. Machine tools manufactured by the following companies: Bridgeport Safety Emery Wheel Co., Dreses Machine Tool Co., Kane & Roach, Kempsmith Mfg. Co., Monarch Machine Tool Co., David H. Smith & Son, Thompson Grinder Co. (See list of individual exhibits under company's name.) Joseph Wainwright, New York; R. S. Dean, Chicago.

MARSHALL & HUSCHART MACHINERY CO., 571 West Washington Boulevard, Chicago. Booths 217 to 240. Machine tools manufactured by Abrasive Machine Tool Co., East Providence, R. I.; Acme Machine Tool Co., Cincinnati; Baker Brothers, Inc., Toledo, Ohio; Blanchard Machine Co., Cambridge, Mass.; Bullard Machine Tool Co., Bridgeport, Conn.; Cincinnati Bickford Tool Co., Cincinnati; Cincinnati Milling Machine Co., Cincinnati; Cincinnati Planer Co., Cincinnati; Cochrane-Bly Co., Rochester, N. Y.; Foote-Burt Co., Cleveland; Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.; Gould & Eberhardt, Newark, N. J.; Hammond Mfg. Co., Cleveland; Keller Mechanical Engineering Corporation, Brooklyn; Landis Machine Co., Waynesboro, Pa.; Lodge & Shipley Machine Tool Co., Cincinnati; Moline Tool Co., Moline, Ill.; National Automatic Tool Co., Richmond, Ind.; Oilgear Co., Milwaukee; V. & O. Press Co., Hudson, N. Y., and Nazel Engineering & Machine Works, Philadelphia. H. W. Jones, president; Frank Seese, secretary and treasurer; J. R. Porter, general manager; F. A. Bennett, George Habicht, Jr., J. G. Klaiber, J. R. Lawrence, George R. Ray, H. F. Roberts, A. L. Van Dyck and E. V. Wenzell.

MCCROSKY TOOL CORPORATION, Meadville, Pa. Booth 340A. A demonstration of McCrosky quick-change chucks and collets. A complete exhibit of McCrosky adjustable reamers, railroad reamers, McCrosky turrets and McCrosky self-centering frictionless steady-rests. F. I. Fisher, Chicago manager; A. J. Moore and I. C. Cameron, Chicago; C. M. Sutton, sales manager; R. W. Thomas, general manager; W. J. Greenleaf, factory representative.

MCGILL METAL CO., Valparaiso, Ind. Booth 6. Standard line of radial and thrust ball bearings and several special bearings. Also a demonstration involving some of the conditions obtaining in ball bearings in service. F. R. Schubert, vice-president; W. E. Brownell, treasurer; F. L. Robinson, quality manager; C. V. Johnson, Chicago sales manager; R. W. Barggren, Chicago representative.

METALWOOD MFG. CO., Detroit. Booth 356-A. Hydraulic crankshaft straightening press. Frederick Fisher, president.

MICHIGAN TOOL CO., Detroit. Booth 164. Complete line of metal-cutting tools, especially hobs and gear cutters. Otto Lundell, vice-president; T. A. Oleck and Messrs. Tucker and Gripton, Chicago representatives.

MICRO MACHINE CO., Bettendorf, Iowa. Booth 396. Model F G internal grinder, in operation; section of grinding spindle; photographs. H. H. Yerk, general manager; W. J. Baumberger, chief engineer; H. H. Moor, sales engineer; Alvin Erickson, factory demonstrator.

MIDVALE CO., Nicetown, Philadelphia. Booth 41. Heavy finished machined forgings, high-speed steel, hardened and ground forged steel rolls, stainless steel and locomotive-driver tires. A. C. Dinkey, president; Stuart Hazlewood, vice-president in charge of sales; Dr. H. L. Frevert, vice-president in charge of operations; Francis Bradley, general superintendent; Henry Ziesing, assistant sales manager; H. E. Rowe, bar steel sales manager; F. W. Sager, Chicago district manager; W. B. Smyth, Cleveland district manager; Ward A. Miller, New York district manager; Harvey Garrett, Pittsburgh district manager; Howard Myers, engineer of tests, and J. R. Adams, research engineer.

MODERN GRINDER WORKS, CONSOLIDATED MACHINE TOOL CORPORATION, Erie, Pa. Booth 265B. Roll grinder; pipe threading machine; cutters; collapsible taps and dies. C. E. McArthur, sales manager; T. P. Scott, salesman.

MOLINE TOOL CO., Moline, Ill. Booths 217-240. No. 6-D, 36-in. Hole-hog drilling machine with special 2-spindle heads. Wilson P. Hunt, president; Franklin Johnson, vice-president; C. R. Rosborough, secretary; A. E. Lindberg, H. D. Gentry, W. C. Kuschmann, O. R. Reller, W. H. Guthrie, S. L. Brandenburg.

MOLYBDENUM CORPORATION OF AMERICA, Empire Building, Pittsburgh. Booth 9. Samples of molybdenite concentrates, ferro molybdenum, Molyte (calcium molybdenum silicate) and ferro tungsten and tungsten concentrates. J. W. Weitzenkorn, president; Clifton Taylor, sales manager, and W. H. Phillips.

MONARCH MACHINE TOOL CO., Sidney, Ohio. Booths 394-395A. 16-in. x 6 ft. geared-head tool room lathe; 20-in. x 10-ft. geared-head tool room lathe; automatic lathe. W. E. Whipp and J. A. Raterman.

MORSE TWIST DRILL & MACHINE CO., New Bedford, Mass. Booth 15. High speed and carbon twist drills, reamers, milling cutters, taps and dies and special tools. W. T. Read, vice-president and treasurer; F. O. Lincoln, vice-president in charge of sales; J. G. Barr and R. F. Chase.

MORTON MFG. CO., Muskegon Heights, Mich. Booth 353. Morton heavy duty draw cut pillar type shaper; Robinson automatic air hose coupling for pipe and hose lines. H. H. Morton, president; G. F. Goble, mechanical engineer.

MURCHEY MACHINE & TOOL CO., Detroit. Booth 348A. Collapsible taps; self-opening dies and solid adjustable taps. A. J. Prance, vice-president; W. C. Beuchner, sales manager; A. J. Moore, I. Cameron and J. H. Sipchen.

N

NATIONAL ACME CO., Cleveland. Booths 342-343. A 1-in. model C five-spindle Acme automatic screw machine set up and operating on a typical part made from bar stock. A 1¼-in. model G four-spindle Gridley automatic screw machine, set up and operating on a part particularly adaptable to this type of machine. A new line of threading tools shown for the first time. New revolving and stationary types of self-opening die heads, and new "Namco" collapsible tap. R. J. Preston, manager of Western offices; A. E. Drissner, chief engineer; K. H. Crumrine, manager die and tap department; A. W. Scherer, C. E. Hartley and H. U. Gordon, Western representatives.

NATIONAL AUTOMATIC TOOL CO., Richmond, Ind. Booths. 217-240. A new "Natco" multi-driller; a new "Natco" multi-tapper; "Natco" universal joints; "Natco" tap holders; and "Natco" drill holders. E. D. Frank, sales manager; R. E. Sterling, assistant sales manager; S. E. Bergstrom, Chicago representative.

NATIONAL ELECTRIC LIGHT ASSOCIATION, Chicago. Booth 94. Photographs of electric heating installations of all kinds, together with operating data of each one and samples of the materials that have been treated. J. H. Faulkner, chairman, industrial heating engineer, Commonwealth Edison Co.; J. D. Haynesworth, industrial heating engineer, Public Service Co., Chicago; O. Wilhelmy, industrial heating engineer, Union Gas & Electric Co., Cincinnati.

NATIONAL MACHINERY CO., Tiffin, Ohio. Booth 178. Samples of quality forgings produced on National high-duty forging machines. F. J. Mawby, K. L. Ernst, D. J. Crowley and C. D. Harmon.

NATIONAL TWIST DRILL & TOOL CO., Detroit. Booths 330-335. Drills, reamers, hobs, cutters and special tools. A practical demonstration of parabolic milling cutters in operation. C. E. Smith, vice-president and manager of sales; Harry Butler, assistant sales manager; E. J. Chamberlain, Chicago; and F. A. Green, J. C. Buck, J. S. Fogarty, W. R. Crook, F. G. Wright and George Webster.

NAZEL ENGINEERING & MACHINE WORKS, Philadelphia. Booths 217-240. 18-in. Dill slotting machine; No. 4-B Nazel air hammer. J. M. Nazel, president and treasurer; C. H. Wackernagel, vice-president; R. E. Miller.

NEFF, KOHLBUSH & BISSELL, INC., Chicago. Booths 272-283. Metalworking equipment manufactured by the following companies: B. C. Ames Co., Anderson Die Machine Co., Billings & Spencer Co., Blake & Johnson Co., Cincinnati Shaper Co., Flather Co., Gisholt Machine Co., Kingsbury Mfg. Co., Oesterlein Machine Co., Henry Pels & Co., Inc., Sleeper & Hartley, Inc., Stockbridge Machine Co., Zeh & Hahnemann Co., O. Zernickow Co. From Chicago: L. G. Neff, A. H. Kohlbusch, A. W. Bissell and W. H. Lucas, Jr., and W. C. Muller, Milwaukee.

NEW BRITAIN MACHINE CO., New Britain, Conn. Booths 301 and 305. No. 12-A, New Britain three-spindle automatic chucking machine, equipped with air-operated chucks on high-production brass job. No. 652, New Britain New-matic chucking machine, equipped with air-operated chucks on valve-stem guide. No. 226, 1-in. x 5-in. New Britain sextuple automatic bar machine, on production of nut blanks. H. H. Pearse, president; E. L. Steinle, manager machinery sales; H. L. Wilson, Chicago; T. C. Stirling, Detroit; G. K. Atkinson, Ohio; Frank Rau, Carl Beiser, Charles Perry and Clifford Hanson.

NIAGARA MACHINE & TOOL WORKS, Buffalo. Booths 266-267A. No. 59 Niagara straight-side single-crank press, geared frame of 4-piece tie-rod construction. No. 696 Niagara power gap squaring shear. No. 5 Niagara inclinable power press. R. J. Caplin, sales engineer.

NILES TOOL WORKS CO., DIVISION OF NILES-BEMENT-POND CO., Hamilton, Ohio. Booths 298-303. Niles 36-in.-44-in. side head boring mill, 42-in. new design Time Saver planer, 30-in. Time Saver lathe, 5-ft. Right Line radial drill, 3-ft. Morris radial drill. Harold F. Welch, general sales manager; D. S. Woods, Chicago; W. S. McCormick, St. Louis; H. W. Kopf, Detroit; L. C. Cole, chief engineer; H. K. Smyth.

NORTON CO., Worcester, Mass. Booths 298-303. No. 2 universal tool and cutter grinding machine; type G surface grinding machine; type B wheel drive unit; and 10-in. x 18-in. BA special purpose grinder. Wheel Division, Space 111: Grinding wheels, Norton refractories and Norton floors. (Machine Division): H. N. Cudworth, Chicago; M. E. Mattson, Milwaukee; H. L. Swainey, Chicago; C. H. Hill, Indianapolis; O. E. Nordstrom, Cleveland; O. A. Knight, Detroit; H. J. Griffing, Worcester, assistant sales manager; W. T. Montague, Worcester, sales manager; Hans Wickstrom, Worcester, chief demonstrator. (Wheel Division): G. W. Thomson, Chicago; H. K. Clark, Chicago; and H. A. Blackburn.

R. D. NUTTALL CO., Pittsburgh. Booth 166. Large ring gear, spur-type, heat treated. Large Simmonds crusher, bevel gear, heat treated. R. F. Fiske, sales manager; J. E. Mullen, assistant sales manager; R. W. Young, sales engineer.

O

OESTERLEIN MACHINE CO., Cincinnati. Booth 281. No. 4 plain milling machine with new Veeflat overarm and enclosed motor drive. G. M. Meyncke, sales manager; O. J. Michaels, sales engineer.

OHIO MACHINE TOOL CO., Kenton, Ohio. Booth 308. 32-in. Ohio "Dreadnaught" shaper. S. H. Peters, superintendent.

OHIO STEEL FOUNDRY CO., Lima, Ohio. Booth 73.

OILGEAR CO., Milwaukee. Booths 217-240. No. 3 broaching machine, motor driven, complete with broach support and broach clamping device, and also a type PJ 10-ton press, complete with motor drive, semi-automatic control, lubricant pump and piping and splash pan. W. D. Creider, sales manager; H. B. Hayden, general manager; H. M. Swigart, vice-president; G. H. Fobian, assistant sales manager; F. L. Young, development engineer; Wilfrid Pulver, superintendent; L. A. Barrett, sales engineer; Walter Ferris, chief engineer; and J. P. Ferris, assistant chief engineer.

O. K. TOOL CO., INC., Shelton, Conn. Booth 191. New designs of inserted tooth milling cutters showing new applications of forged high-speed steel blade wedged into the alloy steel body. A revolving cutter display showing O K milling cutters making various types of cuts; O K cutters cutting high carbon steel at heavy feeds and speeds. F. J. Wilson, secretary; F. Schroeder, sales representative; R. R. Weddell, engineer; and E. Raduhn, service representative.

OLIVER INSTRUMENT CO., Adrian, Mich. Booth 285B. "Oliver of Adrian" drillpointer, point thinner and die-making machine. E. C. Oliver.

TINIUS OLSEN TESTING MACHINE CO., Philadelphia. Booth 82. Latest Olsen automatic and autographic universal testing machine, of three-screw type, with quick change eight-speed reverse gear box drive; latest Olsen Brinell hardness testing machine, both hand-operated and motor driven, also ductility testing machines and instruments, such as Extensometers and strain gages, Olsen-Carwen static-dynamic balancing machines of horizontal type for balancing crankshafts, armatures and other rotating parts, and new Olsen-Lundgren vertical spindle type of flywheel balancing machine. T. Y. Olsen, vice-president and treasurer; R. B. Lewis, chief engineer—testing; Jacob Lundgren, chief engineer—balancing; W. J. Tretch, engineer.

OXWELD ACETYLENE Co., New York City. Booth 160. New applications of the oxyacetylene flame (a) spot hardening of malleable iron; and (b) stelliting (covering surface of ordinary steel with the hard, wear-resisting alloy stellite). E. E. Thum and H. H. Griffith, technical publicity department, and Frank Langstrom, Detroit manager.

P

PARK CHEMICAL Co., Detroit. Booth 24A. Case-hardening compounds, cyanide mixtures, lead pot covering, reheating salts, tempering salts, rubbing compounds for rubbing and finishing lacquer work. J. N. Bourg, vice-president and general manager; D. W. Bauer, secretary; J. C. Thompson, F. W. Faery.

PEERLESS MACHINE Co., Racine, Wis. Booth 128. 9-in. universal shaping saw, equipped with motor. 6-in. Peerless high-speed metal saw, equipped with motor. A. H. Goetz, sales manager; Charles Rasmussen, mechanical engineer and superintendent; C. A. Schuman, assistant manager.

HENRY PELS & Co., INC., New York City. Booth 273. Triple combined punch, splitting shear, bar, angle and tee cutter with diagonal slide, with latest improvements as regards punch stripper, double spindle angle stripper and single spindle plate hold down and quickly interchangeable bar and angle knives. Bar and billet shear for cutting 3⅝-in. rounds, 3-in. squares, and 8-in. x ⅞-in. or 6-in. x 1⅛-in. flats, at 28 strokes per minute. Quadruple combined punch, splitting shear, bar, angle and tee cutter with diagonal slide, with built-in coping attachment. I. Maddaus, president.

PEOPLE'S GAS LIGHT & COKE Co., Chicago. Booths 177A-179A. A working display, consisting of several types of automatic heat-treating machines and quenching tanks, as well as a complete display of oven furnaces, forges, salt baths, burner equipment and blowers. Special attention is being given to automatic temperature control and one-valve control combustion systems. R. G. Guthrie, metallurgist; J. A. Comstock, assistant metallurgist; C. F. Teuber, sales engineer, and H. F. Rehfeldt, sales engineer.

PERFECTION TOOL HARDENING Co., Chicago. Booth 13A. Tools and other material heat treated by company. John Hulting.

PITTSBURGH INSTRUMENT & MACHINE Co., Pittsburgh. Booth 64B. Brinell hardness testing machine; Brinell microscope; Brinell microscope with illuminator; depth-gage for Brinell tests; impact testing machine; metal sheet tester; metallographic grinder and Buvingers weight calculating instrument for car wheel manufacturers. Paul Kammerer and Charles Trueg, proprietors.

PLIBRICO JOINTLESS FIREBRICK Co., Chicago. Booth 84. "Plibrico" furnace lining, a monolithic lining that is installed while plastic and when vitrified by the first heat of the furnace gives a jointless one-piece lining of long life. J. E. Anderson, I. S. Pieters, C. W. Peacock, I. Kuttnauer and Frank S. Rieder.

POTTER & JOHNSTON MACHINE Co., Pawtucket, R. I. Booths 289-293. 6-D turret type automatic in full operation machining drive gears; 6-DP platen type automatic in full operation machining rear axle carrier. N. R. Earle, manager of sales; L. J. Orr, Chicago.

PRATT & WHITNEY Co., Hartford, Conn. Division Niles-Bement-Pond Co. Booths 286-303. A complete small tool and gage exhibit; jig borer with rotary table, 6-in. vertical shaper, model B; 12-in. vertical shaper, model B; 13-in. lathe, model B, with attachments; 16-in. lathe, model B, with attachments; 14-in. vertical surface grinder, model B; 1-in. x 18-in. full automatic lathe; and full automatic centering machine. C. R. Burt, general manager; C. M. Pond, manager small tool works; D. Ayr, factory manager; A. H. d'Arcambal, small tool and gage general sales manager; W. P. Kirk, machinery general sales manager; E. C. Schultz, advertising manager; D. S. Woods, Chicago; F. A. Armstrong, Chicago; W. Gourlie, gage division.

PRECISION TRUING MACHINE & TOOL Co., Cincinnati. Booth 348B.

PRODUCTION MACHINE Co., Worcester, Mass. Booth 292. Type "A" centerless feed production polishing and finishing machine complete. Type "R" combination production polishing and finishing machine. Type "S" junior centerless production polishing and finishing machine. Also exhibit of screw plates made by Wells Tap & Die Co., Greenfield, Mass. W. S. Howe, president and treasurer; A. H. Behnke, vice-president and sales manager.

PYROTUNG MFG. Co., Chicago. Booth 25B. Samples of "Pyrotung" products consisting of the following: Lathe, planer and shaper tools. Special tools for machine use made of "Pyrotung" metal. Beaded and flat type of track drills. Boring tools, signal and bonding track drills, track rachet drills. W. A. Otis, president; C. E. Sutton and B. C. Cleveland, vice-presidents; C. E. Pynchon, general manager; C. T. Chance, superintendent of tests.

R

RACINE TOOL & MACHINE Co., Racine, Wis. Booth 190. No. 5 Racine high speed metal cutting machine, 6-in. x 6-in. capacity, motor driven. Racine duplex band saw machine with two-speed transmission and gravity speed vise, type No. 14. New model of 6-in. x 6-in. high speed reciprocating machine, with screw feed for consistent cutting time. Racine junior, 4-in. x 4-in. metal cutting machine, direct motor drive through worm gears. M. E. Erskine, president; J. M. Jones, vice-president; E. R. Larson, district sales manager.

RAHN-LARMON Co., Cincinnati. Booths 366-376. 20/40 Series AG Rahn-Larmon extension bed gap lathe. A. J. Larmon.

RAND KARDEX SERVICE CORPORATION, Tonawanda, N. Y. Booth 12B. Card index systems for offices and plants.

REED-PRENTICE CORPORATION, Worcester, Mass. Booth 367. Vertical milling machine and new model No. 6 Becker die sinker and vertical milling machine, shown for first time. F. W. McIntyre, vice-president; R. C. Blackinton, chief engineer; Albert Benson.

REEVES PULLEY Co., Columbus, Ind. Booth 120. Reeves variable speed transmission, used for giving infinite speed control and adjustability to any type of machine, group of machines, or conveyor. C. M. Reeves, vice-president; A. E. Shibley, manager Chicago branch; C. B. Mott, manager Detroit branch; F. T. Moore and C. B. Robinson.

REPUBLIC FLOW METERS Co., Chicago. Booth 40. Recording (duplex) pyrometer, control pyrometer, indicating pyrometer, various types of thermocouples, twelve-point double pole switch, twelve-point plug-type switch and other accessories. J. D. Cunningham, president; J. M. Spitzglass, vice-president; G. D. Conlee, engineer; M. J. Evans, sales manager; H. H. Skabo and S. C. Vail, salesmen.

RIVETT LATHE & GRINDER CORPORATION, Boston. Booth 352B. Plain bench lathe with complete equipment, a new model and shown for the first time. Back geared screw cutting precision lathe on oak cabinet. Production small-hole internal grinding machine, motor driven with direct reading gaging device. Collets. Rivett threading tool. M. E. Johnson, treasurer and assistant manager; A. L. Hathorne, service manager.

STANLEY P. ROCKWELL Co., Hartford, Conn. Booth 113. The Rockwell "Dilatometer" for the "Volcrit" method of heat treatment. This includes the standard equipment with the Dilatometer mounted on a 10-in. x 16-in. electric pit-type furnace, as well as a special laboratory model just brought out to fill the demand that existed for such an instrument. S. P. Rockwell, president; W. D. Fuller, vice-president; Dr. R. W. Woodward, secretary; W. A. Stumpf, sales engineer.

W. S. ROCKWELL Co., NEW YORK. Booth 134. Models of operating furnaces. H. J. N. Voltmann, R. M. Atwater, and C. D. Barnhart.

RODMAN CHEMICAL CO., Verona, Pa. Booth 116. "Carbo" carburizing materials. Quenching oils, demonstration of quenching speed. "Sealright" luting compound. Hugh Rodman, president and general manager; O. T. Muehlemeyer, Rockford, Ill.; G. A. Webb, Detroit; and S. P. Rockwell, Hartford Conn.

ROESSLER & HASSLACHER CHEMICAL CO., New York City. Booth 49. Cyanegg and cyanide mixtures used in case hardening and heat treatment. Chemicals used in electroplating. Case hardened and plated steel parts. Demonstration of electroplating and heat treatment. W. M. Gager, case hardening expert; C. H. Proctor, plating expert.

RUEMELIN MFG. CO., Minneapolis, Minn. Booth 141B. Sanitary sand-blast equipment for rapid and economical cleaning of forgings and other heat-treated parts, consisting of sanitary sand-blast cabinets, propeller fans, exhauster fans, sand sifter, sand-blast guns and helmets. R. Ruemelin, president; C. H. Scholer, salesman.

JOSEPH T. RYERSON & SON, INC., Chicago. Booths 300-308. Conradson 21-in. lathe, Conradson No. 2 milling machine, steel frame punch and shear, No. 0 friction saw, Ohio "Dreadnaught" shaper, Harnischfeger horizontal boring, drilling and milling machine. A. G. Bryant, manager machinery department; C. R. Gregg, assistant manager; A. P. Schumann, F. W. Delanty, F. G. Grosse, F. J. Clark, R. C. Page, D. MacArthur, salesmen.

S

SAFETY EMERY WHEEL CO., Springfield, Ohio. Booth 81. 12-in. motor-driven grinder with foot-treadle control; 24-in. motor-driven grinder with push-button control; No. 12 portable motor-driven polisher; grinding wheels; safety collars. H. G. Bennett, L. P. Lamborn, C. L. Hyde and J. W. Hyde, salesmen; H. G. Weinland, mechanical engineer; C. W. Gwyn, vice-president.

GEORGE SCHERR, New York. Booth 284. Schuhardt & Schutte gear hobbing machine, 51-in.; rotary cutting-off machine, 3½-in.; automatic hob grinder, 8-in.; line of Carl Zeiss measuring tools. George Scherr, F. Koenig, G. Van de Plank.

SEBASTIAN LATHE CO., Cincinnati. Booths 310-328. 15-in. x 6-ft. motor in the leg geared head lathe; 20-in. x 8-ft. semi-automatic production lathe with motor in the leg. E. E. Stokes, president; William Schroder, works manager; Irvin Grannemann, demonstrator.

SENECA FALLS MACHINE CO., Seneca Falls, N. Y. Booths 402-403. Seneca Falls cost-cutting turning equipment; "Lo-Swing" plain and automatic; "Short-Cut" production lathes and "Star" screw-cutting engine lathes. E. R. Smith, vice-president and general manager; J. A. Fyfe, secretary; W. H. Nettle, Detroit; J. A. Camm, Milwaukee-Chicago; F. B. Webb and M. C. Day, sales engineers.

SHORE INSTRUMENT & MFG. CO., Jamaica, N. Y. Booth 51. New type C-D hardness-testing machine. Shore type C-2 scleroscope with latest improvements, vertical scale bulb type. Shore type D recording scleroscope improved. Shore Localcase and Shore Localhard. F. G. Kendall, sales manager.

SIDNEY MACHINE TOOL CO., Sidney, Ohio. Booths 266-267C. 12-in. x 5-ft. Sidney motor-driven geared-head engine lathe; 14-in. x 6-ft. motor-driven geared-head engine lathe; 16-in. x 6-ft. cone head, tool-room lathe; 18-in. x 8-ft. motor-driven geared-head engine lathe. A. C. Getz, general manager; B. A. Getz, sales manager; C. E. Brown, factory superintendent; F. D. Dickas, chief designer; M. K. Miller, lathe-shop foreman.

SIMONDS SAW & STEEL CO., Fitchburg, Mass. Booth 212. Complete line of solid and inserted-tooth metal-cutting saws, files, hack-saw blades, carbon and alloy steel sheets and bars. C. R. Pafenback, steel sales manager; H. D. Weed, G. R. Bird, H. P. Baumann.

S. K. F. INDUSTRIES, New York. Booth 161. Bearings. R. C. Ryler.

SKYBRYTE CO., Cleveland. Booth 157. "Skybryte" liquid glass-cleaning material used for cleaning dirty glass such as is found in steel mills, foundries, machine shops, etc. T. T. Holt, president; B. T. Sherk, Western manager.

SLEEPER & HARTLEY, INC., Worcester, Mass. Booth 280A. Spring-making machinery; one universal spring-coiling machine. Patsy Mignacca.

SMITH & MILLS CO., Cincinnati. Booths 310-328. 20-in. back crank shaper, complete with all standard equipment; arranged for motor drive and including 5-hp. type KT General Electric motor with magnetic switch and push-button control. J. E. Mills and W. J. Strewing.

DAVID H. SMITH & SONS, INC., Brooklyn. Booth 394. Amplex No. 16 quadruple combination punch, plate shear, bar, tee and angle cutter and notcher; Amplex No. 11, combination punch, plate shear, bar tee and angle cutter. David H. Smith, chairman board of directors; Austin D. Smith, president; Dudley J. Smith, vice-president and sales manager; W. H. Kay, Western sales manager.

SOUTHERN MANGANESE STEEL CO., St. Louis. Booth 52. Heat-resisting and corrosion-resisting alloy sold under the trade name of "Fahralloy," consisting of carburizing boxes, annealing rabble arms, rabble holders and rabble blades, hearth plates. Also manganese steel castings for rolling mills. A. W. Daniels, general sales manager American Manganese Steel Co.; E. F. Mitchell, sales manager Southern Manganese Steel Co.

SPENCER TURBINE CO., Hartford, Conn. Booth 183. Spencer turbo-compressors for supplying air for oil and gas-burning industrial furnaces, foundry cupolas, and other industrial purposes at pressures of 1 lb., 1¼ lb., 1½ lb. and 2 lb. S. E. Phillips, secretary; H. M. Grossman, sales engineer; A. W. Peard, Western manager; C. E. Kauffman and I. J. Kristufek.

STANDARD FUEL ENGINEERING CO., Detroit. Booth 182. Heat-treating furnaces. Special refractories. High-temperature cement. G. H. Willett, president; T. Q. Cleland, C. S. Gordon, Richard Schoenfeld.

STANDARD STEEL SPECIALTIES CO., Beaver Falls, Pa. Booth 114. Woodruff keys; milled taper pins; machine keys; machine rack; milled steel shapes. J. B. Jamison.

STANDARD TOOL CO., Cleveland. Booth 176. Carbon and high-speed twist drills, reamers, taps and milling cutters, drill chucks. J. H. Brinker, Chicago manager; F. C. Selzer, John Taylor, R. B. Nuckols and J. L. Roddy.

L. S. STARRETT CO., Athol, Mass. Booth 309. Mechanics' tools including latest micrometers, small and large sizes; vernier calipers and height gages; a variety of steel rules; steel tapes; calipers and dividers; steel squares; bevel protractors; levels; leveling instruments. F. A. Ball, president; A. W. Smith, Chicago manager; A. H. Starrett, master mechanic; D. Findlay, sales manager.

STEEL CITY TESTING LABORATORY, Detroit. Booth 5. Style A, hand-operated Brinell testing machine. Type O, power-operated hydraulic Brinell testing machine. Saurer piston-ring tester. Type R-2 apparatus for dishing test of thin plates. Type P hardness-testing hammer. Type PMC portable apparatus. Type SC for testing brass, bronze and aluminum. Type P apparatus, portable, for measurement of hardness of metals. Type N testing apparatus for the measurement of hardness of thin plates. The S. K. W. adapter for improving accuracy and speeding up scleroscope testing and eliminating the bulb-squeezing operation. Type OM Brinell continuous illuminated microscope attachable to the light line. H. A. Weaver, general manager.

STOCKBRIDGE MACHINE CO., Worcester, Mass. Booth 376B. 20-in. Stockbridge shaper, showing two patented features in Stockbridge shaper design. Stockbridge double crank bearing. A. W. Beaman, general manager.

STOCKER-RUMELY-WACHS CO., Chicago. Booths 366 to 376. Machine tools manufactured by the following companies:

Badger Tool Co., Leon J. Barrett Co., Edwin E. Bartlett, Cincinnati Shaper Co., Gallmeyer & Livingston Co., W. B. Knight Machine Co., Liberty Machine Tool Co., Loshbough-Jordan Tool & Machine Co., Reed-Prentice Corporation. E. H. Wachs, secretary; salesmen: J. H. Mariotte, R. R. Cuthbertson, Joseph Utz and Walter Mickelson.

N. A. STRAND Co., Chicago. Booth 77. Complete units of flexible shaft, grinding, polishing and buffing machines ranging in sizes from 1/10 hp. up to 2 hp. Flexible shafts from 3/16-in. diameter to ⅜-in. diameter. N. A. Strand, president; O. V. Strand, superintendent; C. W. Blakeslee, sales manager.

D. A. STUART & Co., Chicago. Booth 153B. Exhibiting: "Super-Kool" synthesized lard oil, "Kleen-Kut" emulsifier, "Kleen-Kut" soluble oil, "Kleen-Kut" cutting compound and "Kleen-Kut" grinding compound, "Thred-Kut" oil, "Dasco" quenching and tempering oils, "Dasco" slushing compounds. C. A. Day, president; T. B. Langdon, sales manager; W. H. Oldacre, factory manager; C. H. Baker, W. H. Huelster, Paul Slivinski, E. J. Graham, sales engineers.

SUN OIL Co., Philadelphia. Booth 170. Cutting oils, lubricating oils, motor oils, greases. Machined parts that have been cut with Sun cutting oils. C. K. Hague, engineering department; W. D. Hooper, R. S. Drysdale.

SUNDSTRAND MACHINE TOOL Co., Rockford, Ill. Booth 260. 8-in. Sundstrand stub lathe, arranged for motor drive and completely tooled on a production job. 12-in. Sundstrand stub lathe, arranged for motor drive and completely tooled on a production job. One Rockford "Rigidmil," arranged for motor drive, complete with all automatic features on demonstration milling. E. W. Scheel and H. Kent, service department; C. B. DeVlieg, factory manager; D. B. Burleigh, sales manager; G. A. Markuson, sales promotion manager.

SURFACE COMBUSTION Co., New York. Booth 162. Motion pictures, photographs, designs, control records of furnace installations. F. W. Manker, vice-president; A. L. Hollinger, Chicago manager; H. M. Heyn, Detroit manager; F. J. Winder, Pittsburgh; George Ruby and G. M. Anderson, Chicago.

SWEDISH CRUCIBLE STEEL Co., Detroit. Booth 171. Crucible steel lead and cyanide pots, crucible carburizing boxes, nickel-chromium lead pots, nickel-chromium carburizing boxes, retorts, furnace grates and fittings, rails and miscellaneous alloy castings. Henry Nixon, metallurgist; S. R. Allen, sales manager.

SWEDISH IRON & STEEL CORPORATION, Brooklyn. Booth 14. Svea Swedish iron and steel. V. H. Todd.

T

TAYLOR INSTRUMENT COMPANIES, Rochester, N. Y. Booth 59. A full line of electrical pyrometer equipment, including new single and duplex recording pyrometer; new high resistance portable and wall type indicator; automatic pyrometer controller; portable self-contained unit pyrometer; radiation pyrometer; thermocouples; switches; etc. Also mercurial oil and lead bath thermometers; capillary-type indicating and recording thermometers; electric contact controllers, etc. G. H. Howell, factory representative; A. R. Lemke and H. Pagenstecher, Chicago.

THOMPSON GRINDER Co., Springfield, Ohio. Booths 382-396. Thompson self-contained and motor driven 10 x 36-in. universal grinding machine. H. J. Warrick, secretary.

HENRY G. THOMPSON & SON Co., New Haven, Conn. Booth 180. Milband cutting-off machine. G. T. Hey, vice-president of the Avey Drilling Machine Co., Cincinnati; A. W. Tucker, in charge of exhibit, sales representative for Thompson company; S. H. Hamilton, sales representative; A. Lassen, sales representative; R. B. Jones, representative of the Whitehead Sales Co., Chicago, distributer for Henry G. Thompson & Son Co.

TIMKEN ROLLER BEARING Co., Canton, Ohio. Booths 56 and 60. Timken tapered roller bearings as applicable to machine tools and general industrial machinery. Timken steel—section samples and such finished products made from Timken steel as rods, gears, etc. H. H. Timken, president; M. T. Lothrop, H. J. Porter and T. V. Buckwalter, vice-presidents; L. M. Klinedinst, general manager industrial division; J. W. Spray, manager of sales; A. J. Sanford, manager of steel sales; C. A. Swan, steel sales; B. E. Keifer, district manager industrial division; S. D. Williams, steel sales; G. D. Thewlis, R. W. Ballentine and G. W. Curtis, district manager, industrial division; H. C. Weirick, steel inspection engineer; S. M. Weckstein, industrial equipment engineer; T. W. Hardy and J. E. Fick, metallurgists.

U

UNION DRAWN STEEL Co., Beaver Falls, Pa. Booth 158. Cold drawn steel in rounds, squares, flats, hexagons, special shapes and elevator guides. Screw machine products. Crankshafts. E. S. Hoopes, president and general manager; G. B. Mitchell, vice-president in charge of sales; C. H. Beegle, vice-president; L. E. Creighton, operating manager; L. P. Sutter, assistant sales manager; O. W. Thompson, plant manager Gary; J. H. Armour, chief metallurgist; J. A. Quay, purchasing agent and advertising manager; W. T. DeWalt, assistant plant manager Gary; F. R. Bonte, metallurgical sales Gary; A. M. LeTellier, metallurgical sales Beaver Falls; B. H. Elliott, district sales manager Chicago; F. C. Young, Cleveland; Lou Carlisle, Detroit; W. B. Huntley, Buffalo.

UNION ELECTRIC STEEL CORPORATION, Latrobe, Pa. Booth 76A. Alloy structural steels and tool steels. C. B. Ferrel.

UNION MFG. Co., New Britain, Conn. Booth 393B. Lathe chucks, drill chucks, planer chucks and special chucks. E. I. Stevens.

UNION TWIST DRILL Co., Athol, Mass. Booth 140. Milling cutters, twist drills, hobs, saws, taps, dies, reamers and screw plates. J. H. Horigan, secretary, Union Twist Drill Co.; George F. Holland, manager Butterfield & Co., division, of Union Twist Drill Co.; E. H. Anthony, manager Chicago store; H. H. Knopke and W. T. Johnston, Chicago salesmen.

UNISHEAR Co., INC., New York. Booth 68. Various models of "Unishears" for cutting straight lines, curves and complicated designs in sheet metal and other materials. Mr. Conrad, Milwaukee, Western sales manager, and U. F. Steindorff, New York, president.

UNITED STATES ELECTRICAL TOOL Co., Cincinnati. Booth 117. Electrical drills and grinders. J. C. Smith, vice-president; G. E. Smith, treasurer; M. J. Herold, general sales manager; E. C. Price, Chicago; J. E. Hauser, Detroit; R. W. Horsfield, Cincinnati.

UNIVERSAL BORING MACHINE Co., Hudson, Mass. Booths 310-328. "Number 24 Tri-Way" universal horizontal boring machine. L. F. Marsh, mechanical engineer; W. B. Robbins, service representative; C. F. Elston, Detroit factory representative.

UNIVERSAL GRINDING MACHINE Co., Fitchburg, Mass. Booths 310-328. Universal grinding machine; multiple key shaft machine; both made by the Universal Grinding Machine Co. Valve-seat grinding machine made by Fitchburg Grinding Machine Co. G. S. Gould and M. Renaut, salesmen; R. D. Gould, treasurer.

UNIVERSAL STEEL Co., Latrobe, Pa. Booth 61. Bars of high-speed and carbon tool steels, ball and race, magnet, file, heat-resistance and non-corrosive steels. Sheets of saw, magnet, agriculture, soft center, cutlery, spring, heat-resistance and non-corrosive steels. Finished and semi-finished articles made from these steels and machined manganese steel. From

Universal Steel Co.: U. G. Miller, general superintendent; H. M. German, metallurgist; Frank Garratt, sales metallurgist; Frank Saltsman, sales department; H. G. Copp, Jr., research department. From Cyclops Steel Co. of Pennsylvania: Dr. Charles T. Evans, manager, and L. S. Nutting, Chicago representative.

V

VACUUM BELTING CO., Indianapolis. Booth 349B. Vacuum genuine hoghide belting. E. C. Grayson and Theodore Nelson.

VANADIUM-ALLOYS STEEL CO., Latrobe, Pa. Booths 18-19. High-speed, alloy and carbon tool steels; fractures of these showing effects of different treatments; typical tools made of these steels; motion pictures of plant operations. R. C. McKenna, president; Floyd Rose and E. L. Moberg, vice-presidents; J. P. Gill and L. D. Bowman, metallurgists; J. H. Roberts, Eastern sales manager; D. A. Black, New England district manager; A. F. McFarland, Detroit; W. R. Mau, Chicago; R. R. Artz, R. F. Noonan and G. C. Buettner.

VAN DORN ELECTRIC TOOL CO., Cleveland. Booth 395B. Portable electric drills, universal motor types; portable electrical reamers, direct current; portable electric screw drivers; portable electric tappers; portable electric grinders; stationary electric grinders, bench and pedestal types; tool post grinders; electric glue heaters; and bench and wall type drilling stands. L. H. Bellows, G. H. Treslar, W. E. Bair and William Wahlen.

VAN NORMAN MACHINE TOOL CO., Springfield, Mass. Booth 394B. No. 23 oscillating grinder for grinding internal radius in outer ball bearing rings; No. 33 oscillating grinder for grinding external radius in inner ball bearing rings; No. 3 duplex miller. F. D. Van Norman, vice-president; J. Y. Scott, sales engineer; C. H. Whiting, Detroit.

V & O PRESS CO., Hudson, N. Y. Booths 217-240. No. 2 high-speed roll-feed press operating on a production job at a speed of from 250 to 300 r.p.m.; No. 41 high-speed notching press equipped with punch and die and furnished with blanks for actual demonstration operating at a speed of approximately 600 r.p.m. H. U. Herrick, president and general manager; F. A. Beardsley, sales manager.

VULCAN CRUCIBLE STEEL CO., Aliquippa, Pa. Booth 172. High-speed alloy and carbon tool steels, special steels and materials used in their manufacture. S. G. Stafford, president; R. M. Kelso, A. D. Beeken, Jr., S. A. Stafford, Aliquippa; Ed. H. Lurker, C. E. Palmer, O. H. Beall, Chicago; Leo D. Sullivan, Detroit.

VULCAN MOLD & IRON CO., Latrobe, Pa. Booth 13B. Solid ingot molds; split ingot molds and special castings made of electric furnace alloy cast iron. E. H. Williams, president; Edward R. Williams, assistant to president.

W

WALCOTT MACHINE CO., Jackson, Mich. Booths 358-363. Melling cam lathe, Melling contour lathe, Melling pin lathe, Walcott gear-tooth grinder and Walcott gear-tooth burring machine. D. G. Kimball, president; N. R. Townley, vice-president; C. H. Sylvester, experimental engineer; R. G. Williams, salesman; L. E. Broughton.

O. S. WALKER CO., Worcester, Mass. Booths 310-328. Single stroke surface-grinding machine. Rectangular magnetic chucks of various types. Rotary magnetic chucks. Swivelling magnetic chucks. Demagnetizer. Planer parallels. G. J. Shirley, salesman.

WAPPLER ELECTRIC CO., Long Island City, N. Y. Booth 76B. Industrial X-ray equipment shown by means of a series of photographs of equipment and installations, together with representative radiographs and crystal patterns. Ancel St. John, physical metallurgist and consulting physicist, chairman New York chapter American Society for Steel Treating.

WARNER & SWASEY CO., Cleveland. Booths 378 and 379. 3-A universal hollow hexagon turret lathe with 7½-in. bar capacity. Several portable pneumatic tools—the new portable pneumatic grinder with air-governor and a new portable pneumatic reversible drill. C. J. Stilwell, general sales manager; Gerald Kochenderfer, Chicago; Karl Pohlman, John Kunze, Frank Castle.

WESTERN BEARINGS CO., Chicago. Booth 80. Ball and roller bearings, radial and radjo thrust bearings, thrust bearings, thrust washers, special bearings, automatic screw machine products up to 4¼-in. bar; also special grinding work such as surface, concave, convex, internal and external. F. H. Lutzow, president; B. J. Condon, sales manager.

WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa. Booths 92 and 96. Box furnace, type H., fully equipped with Westinghouse automatic heating control and a recording pyrometer to show graphically close temperature control possible; lead and salt pot furnace, type J-10, capacity 150 lb. per hour at 1500 deg. Fahr., intended for continuous service in hardening and tempering tools and gears; high temperature and M. P. furnace heaters and new 1000-watt, 220-volt, 24-in. high temperature space heaters; operating model of new small melting Repel-Arc furnace. T. C. Kelley, industrial heating apparatus manager; J. C. Woodson, manager industrial heating engineering; E. A. Hurme, industrial heating apparatus sales; Edwin Fleischmann, industrial heating engineer, Chicago; F. T. Whiting, industrial manager, Chicago; P. H. Grunnagle, department of publicity.

WHEELOCK, LOVEJOY & CO., Boston. Booths 126-127. "Hy-Ten" alloy steels and "Wheico" tool steels with their application to special parts. A. O. Fulton, president; F. H. Lovejoy, vice-president; E. C. Bartlett, G. A. Baron, C. R. Jenks, L. P. Neeham, A. R. Townsend and F. J. DeVan.

WHIPP MACHINE TOOL CO., Sidney, Ohio. Booth 263A. 36-in. Whipp open-side planer-shaper. G. E. Hieber, general manager.

WHITNEY MFG. CO., Hartford, Conn. Booth 373. All types of Whitney chains for power transmission. E. H. Huntington, Chicago representative; D. L. Wheeler, sales engineer.

WHITNEY METAL TOOL CO., Rockford, Ill. Booth 395C. Hand-operated punches; hand shears; complete unit for working in angle iron; samples of angle iron rolling. John Jensen, manager and secretary; W. J. Meyers, superintendent; Gus Jensen, salesman.

WILMARTH & MORMAN CO., Grand Rapids, Mich. Booth 256. No. 78 super surface grinder, wet, motor drive, with 220-volt, 3-phase, 60-cycle motor. No. 1 universal cutter and tool grinder, power feed, complete with all attachments, motor drive, with three motors, 110-volt, single-phase, 60-cycle. Style "B" point improved "New Yankee" drill grinder, motor drive, 220-volt, 3-phase, 60-cycle. No. 1 surface grinder, belt drive. No. 99 cutter and tool grinder, belt drive. No. 3 wet surface grinder, belt drive. C. H. Slaughter, general sales manager; Arthur Williams, general superintendent.

WILSEY-TUTHILL PUMPS, Chicago. Booth 381. Pumps for circulating liquid on machine tools. O. L. Bock and I. H. Wilsey.

WILSON-MAEULEN CO., New York. Booth 167. Recording thermoelectric pyrometer; indicating thermoelectric pyrometers; recording resistance bulb thermometers; indicating resistance bulb thermometers; automatic temperature controllers and Rockwell hardness testers. M. A. Schreiner, Chicago; C. E. Hellenberg, Detroit; C. Rosecrans, Indianapolis; G. B. Duff, factory sales department.

WISCONSIN ELECTRIC CO., Racine, Wis. Booth 124A. Complete line of "Dumore" high-speed precision grinders, including: No. 1-JG grinder; No. 2-AG grinder; No. 2-OG grinder; No. 2-BG grinder; No. 2-CG grinder and No. 3 multi-speed grinder. L. H. Hamilton, president; C. H. Beach, vice-presi-

dent; L. B. Augustine, sales manager; R. T. Frank and L. J. LaMack, assistants to sales manager; A. B. Clifford and W. B. O'Neill, salesmen; C. A. Pope, advertising manager; Holly Nelson, tool-room foreman.

Z

ZEH & HAHNEMANN Co., Newark, N. J. Booth 277A. No. 10 patent power press equipped with stamping die for metals; No. 36 reclinable power press equipped with blanking die for metals.

ZIV STEEL & WIRE Co., Chicago. Booth 8. Dies and punches, etc., made from Darwin and Milner's "Neor" and P. R. K No. 33 Cobaltcrom, high production steels. Hand and pneumatic tools, chisels, punches, dies, rivet sets, etc., made from Ziv's "Wizard" tool steel. G. F. Ziv, president; A. Ziv, vice-president; N. J. Hyslip, general sales manager; A. F. Brunck, sales manager; H. E. Ziv and R. J. Foley, Chicago.

Welded Steel Fabric for Concrete Highway Reinforcement

The use of welded steel fabric for concrete highway reinforcement is growing steadily, according to the National Steel Fabric Co., Pittsburgh, which recently shipped a trainload of 10 cars of its wire fabric to New Jersey, where it will be used in the widening of the White Horse Pike. Present contracts cover the widening of this thoroughfare for 37 miles. Eventually it will be widened for a distance of 60 miles. When completed it will be 40 ft. wide. The highway extends from Philadelphia to Atlantic City, N. J. For the 37 miles of widening 63 carloads, or about 1000 tons, of the fabric will be required. The material is made from cold-drawn steel wire, electrically welded.

Philadelphia Steel Treaters Offer Steel Treating Course

The cooperative evening course in heat treatment and metallography of steel, conducted at Temple University, Philadelphia, under the auspices of the Philadelphia chapter, American Society for Steel Treating, begins its sixth season on Monday evening, Oct. 4, 1926. Its purpose is to afford men who are engaged in the various lines of work connected with the use and treatment of steel an opportunity to keep abreast with the rapid scientific progress of the art, and to get a sound grounding in fundamental principles. Instruction consists of lectures and laboratory work. The course is self-sustaining, but not for profit.

A feature recently introduced is the "advance class" for those who wish to go more deeply into the subject than is possible in the first year, or to take up special investigations. In this class students are encouraged to work out metallurgical problems arising in their own plants or industries, using the facilities of the well-equipped laboratory, and having the guidance of the instructors, and the benefit of general discussion in the class.

The ideal of the course is cooperative service between the local branch of the society, the university, and the industries of Philadelphia. Its growth testifies to its success in this direction.

Merger of Silica Sand Companies

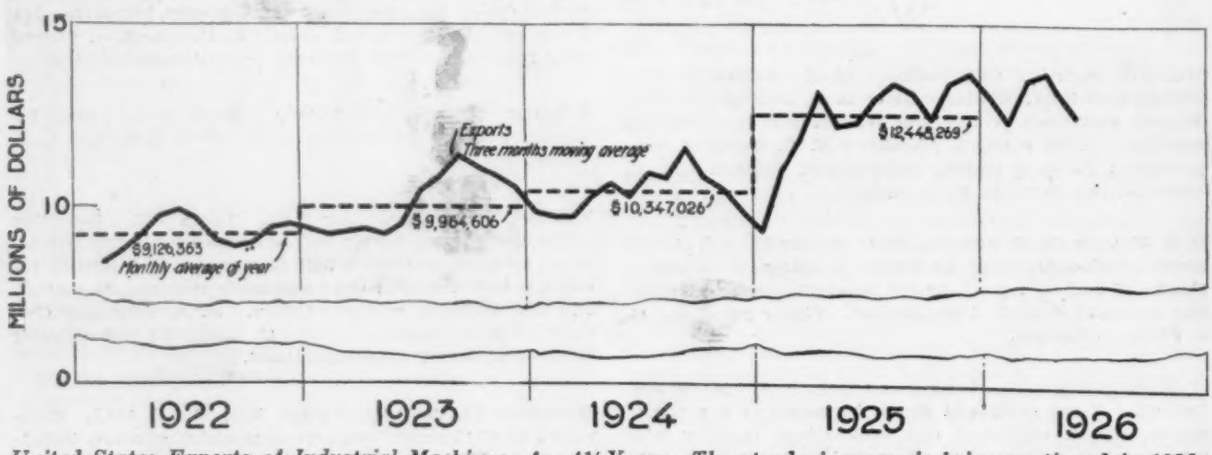
The Higby-Reynolds Silica Co., Columbus, Ohio, newly organized, has taken over the business of the Higby Canyon Sand Co. and the E. J. Reynolds Sand Co., these two companies being large operators in the production of silica sand in the Ottawa-Utica district in Illinois. The combined company will have shipping capacity of 65 cars a day. Officers of the Higby-Reynolds Silica Co. are: T. V. Taylor, president, Columbus, Ohio; A. S. Hindman, vice-president, Railway Exchange Building, Chicago; H. C. Cary, vice-president, Utica, Ill.; C. J. Niesen, secretary, Utica, Ill.; E. W. Weaver, general manager, Ottawa, Ill.

Increasing Industrial Machinery Exports

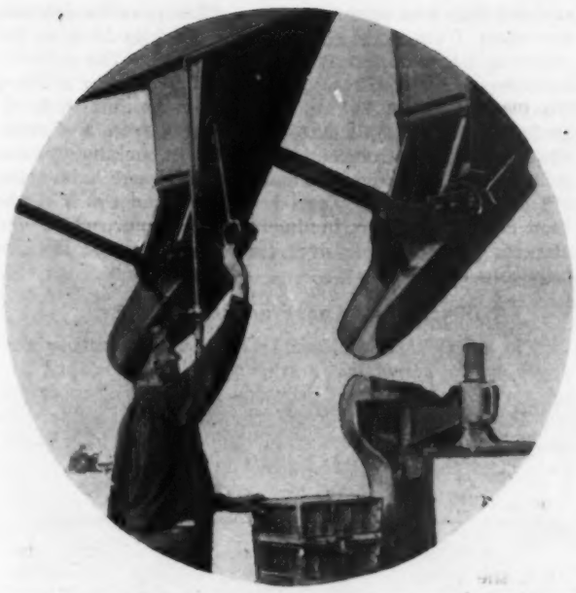
Consistent Rise Through Several Years Is Being Maintained in First Seven Months of 1926

STEADY gains are shown, in the diagram on this page, indicating the exports of industrial machinery from the United States during the past four and one-half years. From a monthly average of $9,126,363 in 1922, the average for 1925 has reached $12,448,269. For the first seven months of 1926 the figure has become $12,954,282. Because of somewhat violent fluctuations from month to month, the curve is plotted on the basis of a three-months moving average, and shows a distinctly upward trend. The gain in 1925 was particularly marked.

Exports of industrial machinery in July amounted to $14,173,036, compared with $11,114,816 in the preceding month and with $13,401,537 in the corresponding month of 1925. In only two months of the past five years has the figure been higher than in July, these having been April, 1926, with $16,100,036, and August, 1925, with $14,555,365.



United States Exports of Industrial Machinery for 4½ Years. The steady increase is being continued in 1926, in which the average of first seven months exceeds by 4 per cent the monthly average of 1925



Sand Handling System Yields Economies

Equipment for Handling and Distributing Sand in Steel Foundry Saves Labor and Floor Space, Speeds Up Production and Simplifies Shop Routine

BY ROGERS A. FISKE*

LESS manual labor, more floor space, accelerated production, simplified shop schedules and a better finish on castings are among the results attributed to new sand-handling and distributing equipment at the foundry of the Nugent Steel Castings Co., 3100 South Wood Street, Chicago. Floor space formerly occupied by molding sand is now available for production. The molder has been spared the time and labor of mixing backing sand and shoveling it from the floor to the flask. That saving has been translated into fewer manual operations, making for a simpler and more regular shop routine and increased facility in meeting delivery schedules.

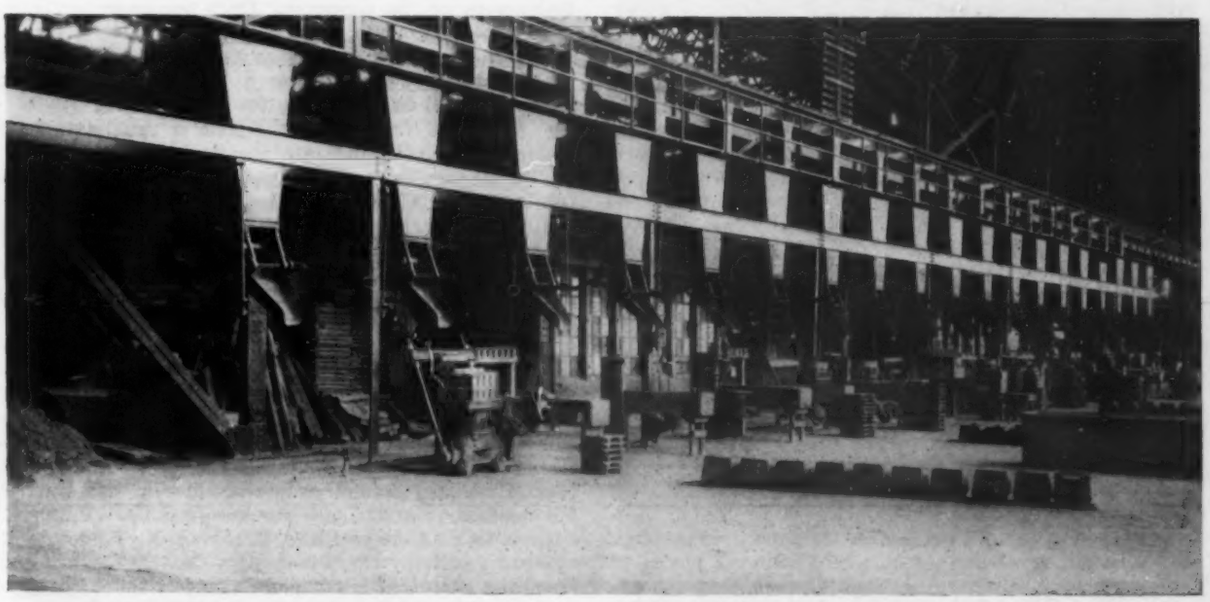
Raw sand is delivered in railroad cars to a switch track which parallels the foundry building and is covered by an open-side leanto. This structure is 50 x 300 ft and is served by an overhead electric traveling crane. Between the track and the building wall is a row of reinforced concrete open-top bins, which are used for the storage of molding sand, core sand, sand-blast sand, emery wheels, ganister, clay, furnace brick, electrodes, ferrosilicon and ferromanganese and other alloys. The three bins at the north end provide storage for 1200 tons of raw molding sand, an amount sufficient to cover the requirements of the plant for the winter months. By filling the bins late in the fall the unloading of frozen materials from railroad cars during cold weather is obviated.

The storage bins are constructed with floors 5 ft. below the track level. Materials are handled from cars to bins or from one storage space to another by a 1¼-cu. yd. bucket suspended from the overhead crane. On the inner sidewalls of the sand bins are painted scales, marked off in feet, so that at the end of each month the stored material may be leveled off and an inventory made.

Truck Moves Sand from Bin to Mill

An opening has been cut through the building wall into the north sand-storage bin. Inside the bin opposite the opening is a boxlike structure the floor of which is level with that of the foundry. In the roof of this structure is a hand-operated valve through which sand may be drawn from the bin and loaded into a box, which is brought in on a storage-battery truck. When sand in storage in the north bin runs low, the clam-shell bucket from the crane is used to replenish the supply by taking sand from the other two bins. It is only a short haul from the bin to a No. 2 Simpson mill, furnished by the National Engineering Co., Chicago. There the raw sand is mixed with the proper proportions of old sand and binders, and it is then reloaded into steel boxes, which are moved by electric trucks. This sand is used for facing and is distributed by shov-

*Western Editor, THE IRON AGE, Chicago.



Molding Sand Is Drawn from Overhead Hoppers. The floor space formerly occupied by heap sand is conserved for production purposes, and the molder is relieved of the labor of mixing the sand and shoveling it into flasks

eling it from the steel boxes to small wooden boxes located near the molding machines. The molder uses a hand riddle in covering the pattern with the facing sand.

The foundry is equipped with two electric furnaces. One is rated at 3 tons per heat and was made by the Pittsburgh Electric Furnace Corporation, Pittsburgh. The other furnace is of 1½ tons capacity and was made by what was then known as the Industrial Electric Furnace Co. The furnaces are located at the south end of the main bay, in which the heavy and medium molding is done. The lighter work, on which snap flasks can be used, is performed in the west side-bay.

Shake-Out Sand Delivered to Reciprocating Conveyor

The large and medium-sized molds are lined up on steel racks and are poured while so mounted. After pouring, the racks are picked up by an overhead electric crane and conveyed to the shake-out bay, where a 4 x 24-ft. grating has been placed in the floor. The molds are shaken out over the grating, the sand falling through to a reciprocating-type conveyor, which consists of a stationary trough in which oscillates a mechanism to which are attached a series of aprons. The aprons are hinged at the top so that on the return stroke they ride over the sand and on the forward stroke they swing down and move the sand. The conveyor moves the sand slowly, allowing it to cool, and delivers it to a short inclined belt conveyor, located at the north end of the pouring floor near the line of columns between the main and west bays.

Molds made in snap flasks are laid out in rows on a cement floor and poured. When cool enough to be shaken out they are lifted by hand and dumped into a shake-out box, which is made of steel. The box is 2 x 11 ft. and 2 ft. high and is provided with bails so that it can be handled by the west bay overhead electric crane. The crane removes the box to a 4 x 18-ft. grating in the floor, where its contents are dumped. The sand falls through to the same reciprocating conveyor which has been referred to. This end of the conveyor, however, moves the sand in the opposite direction, unloading it on the previously mentioned belt conveyor, which discharges to the boot of an elevator.

Sand Eleveated to Magnetic Separator and Revolving Screen

The elevator carries the sand to the roof level, 45 ft. above the floor, where it passes over a short belt conveyor equipped with a magnetic pulley, which removes the small particles of metal and discharges them down a chute to a steel box on the foundry floor. After passing over the magnetic separator, the sand goes through a hexagonal revolving screen which removes pieces of core and wood, discharging them down a chute to another steel box. The screened sand is delivered by gravity to a 65-ton overhead storage tank, which is divided into two compartments. This permits drawing the sand from one-half of the bin while that in the other half is cooling and seasoning. From the tank the sand is delivered through gates by gravity to a No. 3 Simpson sand mill. As previously pointed out, all facing sand is supplied to the molders from a distributing truck. The old sand is used for backing up, and it is that sand which is handled by the new conveying system. The backing sand is tempered in the mill and then drops to a short inclined belt conveyor, which discharges into a hopper over the loading end of the distributing conveyor.

Distributing Conveyor Has Steel Belt

The most striking feature of the distributing conveyor is its conveying belt, which is a hardened and tempered steel band, 16 in. wide by 0.035 in. thick and 600 ft. long overall. From the discharge end of the short belt conveyor the steel band pitches up sharply to a convenient height above the floor and then runs horizontally the full length of the molding floor along the west side of the columns which separate the main bay from the west bay. The steel belt is well adapted for this work, because it prevents side spillage and facilitates the delivery of sand by means of a series of plows to 1½-cu. yd. hoppers serving molding machines below. The conveyor is supported by the building columns and a light structural framework to which are attached the hoppers, each one being located over a molding machine. A service platform extends the full length of the conveyor. Only one operator is required to operate the plows, and he also looks after the lubrication of the entire system. Each hopper is spouted so that by opening a hand-operated gate a flask, mounted on a molding machine, is filled by gravity in a small fraction of the time it usually takes a molder to shovel sand into the flask.

The Distributing Conveyor Is 600 Ft. Long. Sand is delivered by a series of plows into hoppers serving the molding machines

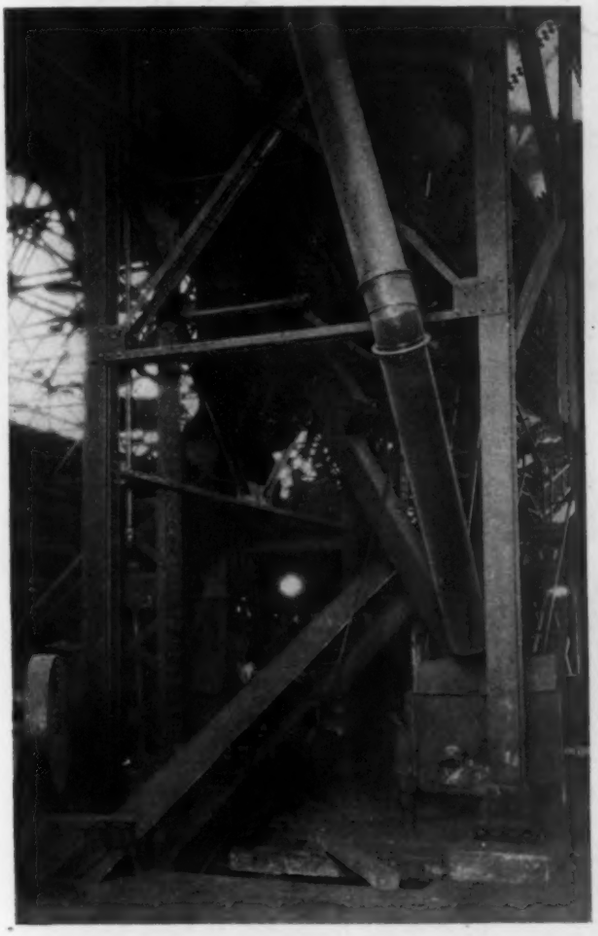
The conveyor system, which was furnished by the Link-Belt Co., Chicago, thoroughly cleans all sand before it is used, does away with the necessity of using sand that is warm and improperly tempered, and eliminates all handling of the sand by hand and the transporting of it over molds, which operations frequently result in defective castings.

The molding equipment served by the system consists of a jolt roll-over machine, made by the Davenport Machine & Foundry Co., Davenport, Iowa; eight jolt machines furnished by the Herman Pneumatic Machine Co., Zelienople, Pa.; two squeezer machines installed by the Federal Malleable Co., West Allis, Wis.; two Milwaukee Foundry Equipment Co., Milwaukee, jolt squeezers; a jolt squeezer supplied by William H. Nichols Co., 2 College Place, Brooklyn, N. Y.; four jolt squeezers built by the Tabor Mfg. Co., Eighteenth and Hamilton Streets, Philadelphia; two jolt squeezers furnished by the Osborn Mfg. Co., 5401 Hamilton Avenue, Cleveland; and two each supplied by the Mumford

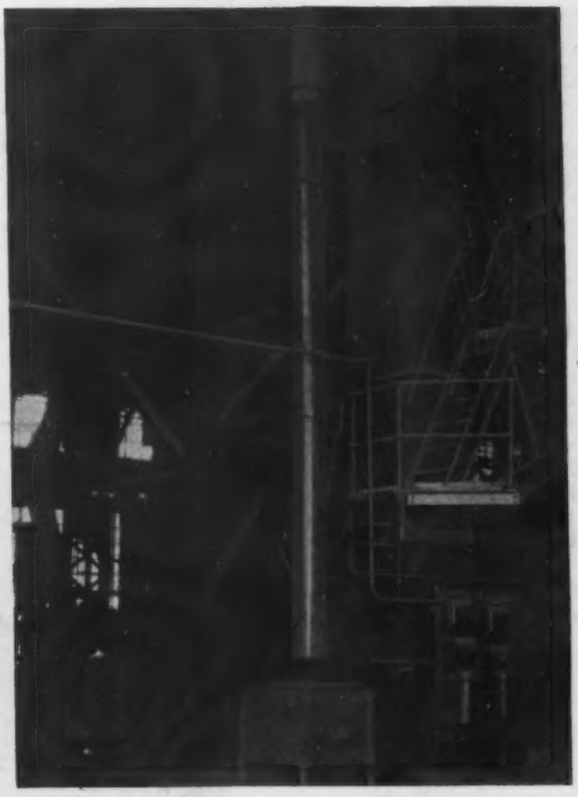
Molding Machine Co., 1765 Elston Avenue, Chicago, and the Arcade Mfg. Co., Freeport, Ill.

The only fuels employed in the foundry are electricity and gas. All melting and annealing are done electrically under automatic control, as is also part of the core baking. Gas is used for the remainder of the core baking. Since both fuels are always on tap, continuity of operation is assured, cleanliness is subserved, and the burden of stocking and handling other types of fuel is eliminated.

The Nugent Steel Castings Co. plant was constructed mostly at one time and, although it has been enlarged from time to time to take care of increased business, additions have always been in accordance with a previously determined plan. While essentially a jobbing foundry, prepared to serve any industry requiring steel castings, the plant is so laid out that there is an uninterrupted flow of work from the time raw materials enter at one end until castings are loaded in trucks or on cars at the other end.



The Inclined Conveyor Is a Steel Distributing Belt, Which Raises the Prepared Backing Sand to a Convenient Height Above the Floor Level, Where It Is Plowed Off into Hoppers Serving the Molding Machines. The pipe extending from above discharges broken cores removed from the sand to a refuse box



The Elevator Raises Sand to the Roof, Where It Passes Through a Magnetic Separator and a Revolving Screen. The screened sand is discharged by gravity into a 65-ton storage tank, in background

A 1½-Cu. Yd. Sand Hopper Is Suspended Above Each Molding Machine. At the right is shown a combination facing sand box, work bench and core rack

To Dedicate Auditorium

The new Stambaugh Memorial Auditorium at Youngstown, Ohio, gift to the community of Henry H. Stambaugh, who died in 1918, will be dedicated on Oct. 18. Mr. Stambaugh was a leading stockholder in the Brier Hill Steel Co., now a part of the Youngstown Sheet & Tube Co., and for a number of years was chairman of its board of directors. A brother, John Stambaugh, who is a director of the Youngstown Sheet & Tube Co., is chairman of the board of trustees governing the auditorium. The building is one of the most beautiful in the Middle West.

Large Shipment of Steel by Lakes

Notable Increase This Year in Water Transport of Rolled Material—Important Additions to Handling Equipment of Docks and Boats

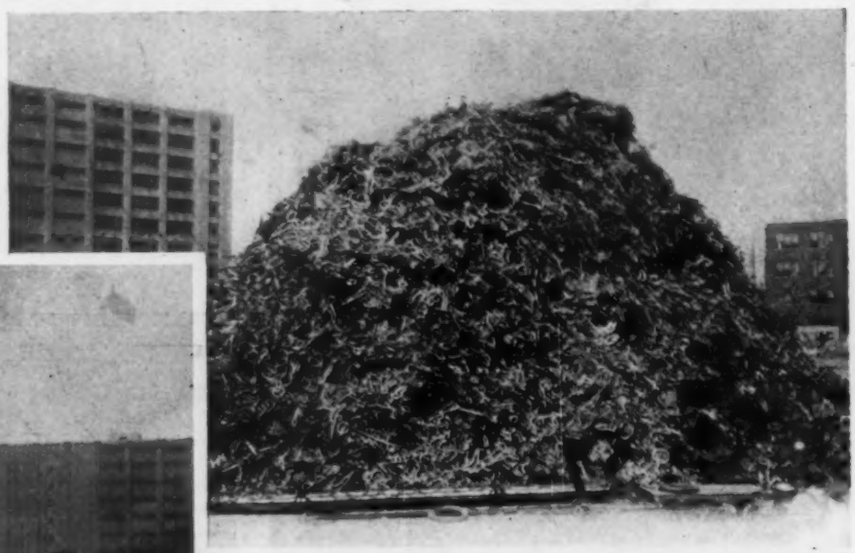
GREATER use of the waterways of the Great Lakes is one of the developments of 1926 in the transportation of iron and steel. Not only have increased vessel facilities been provided for steel shipments in full cargo lots, but two commercial docks have been equipped in Cleveland for handling steel in its various forms to and from vessels. Several ocean type boats have been remodeled to the extent that their old hatches have been taken out and replaced with larger hatches through which steel in long lengths can be loaded.

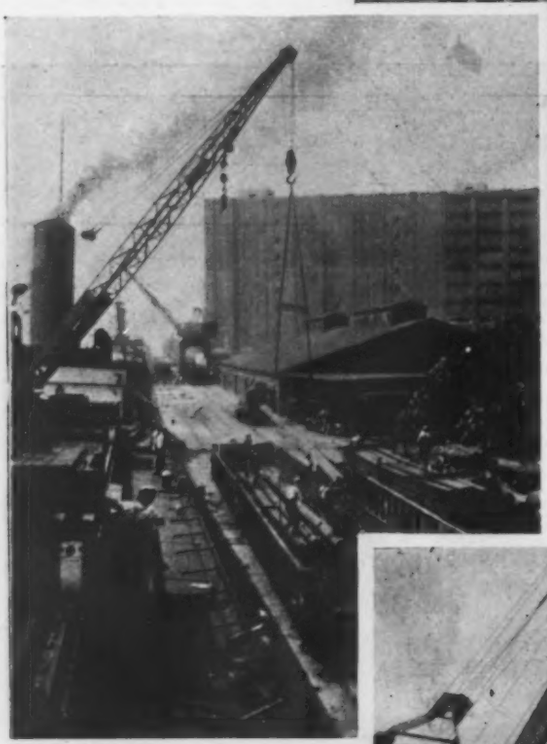
Steel plants at Lake Erie ports are showing considerable interest in the erection of dock equipment and the refitting of boats for cargoes of steel, since they expect that, with the lower transportation charges by water as compared with rail, they will be in a more favorable position to reach distant competitive markets.

Regular Service by Bethlehem

The first regular lake service to be established by a producer for shipping steel from Lake Erie to Detroit and Lake Michigan and Lake Superior ports in a boat especially equipped for that purpose was started early this season by the Bethlehem Steel Co. in connection with the Interlake Steamship Co., which operates the

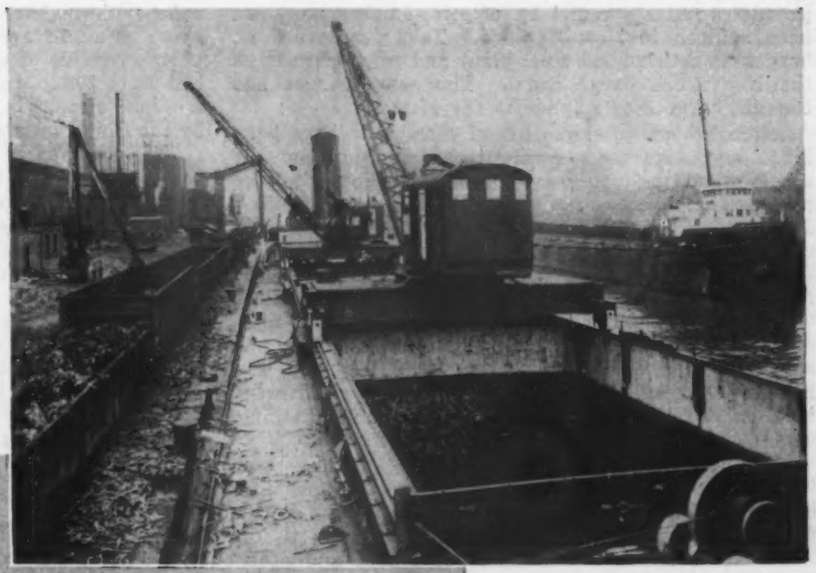
(Below) Unloading Steel from the Lagonda into Cars on a Detroit Dock



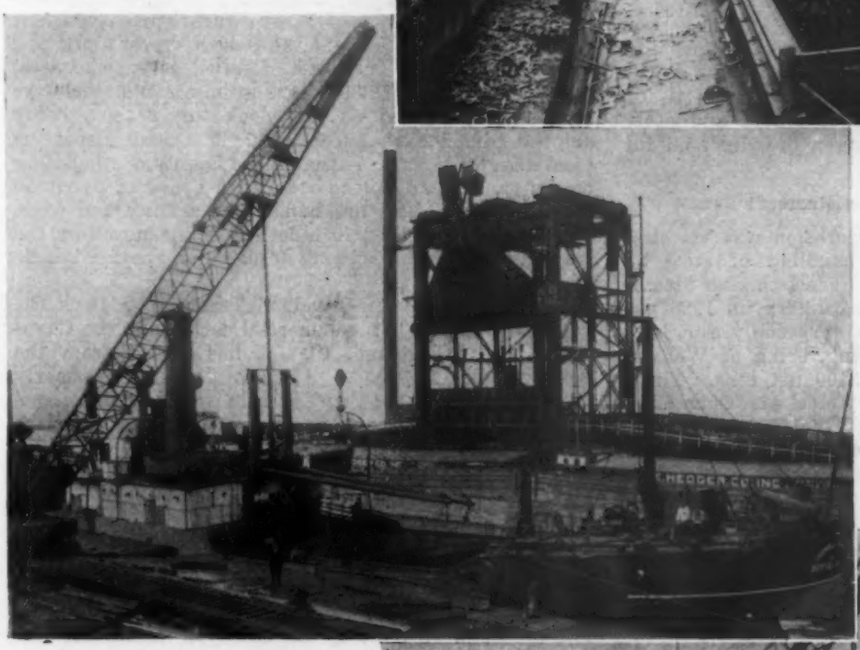


(Above) 2000 Tons of Borings and Turnings from a Detroit Automobile Plant Piled on a Detroit Dock. Waiting to be taken to Buffalo by steamer Lagonda

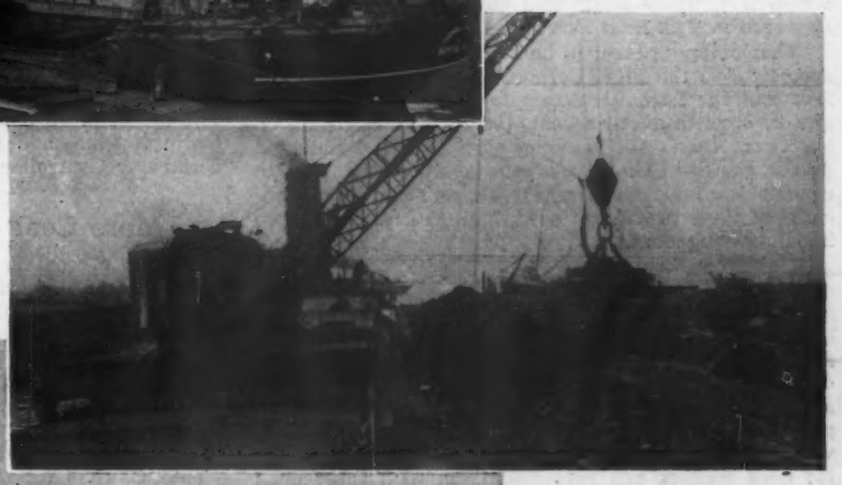
(At Right) The Lagonda Unloading Steel Bars at Detroit. The locomotive crane is provided with a spreader for handling long lengths



(Below) Unloading billets with Locomotive Crane on the Dock of the Cleveland Stevedore Co., Cleveland, from the Steamer John J. O'Hagan. This is an ocean-type boat converted into a steel-carrying steamer by the provision of two large open hatches. The car dumper in the background is located on another dock



(Above) Bethlehem Steel Co. Unloading Scrap at Buffalo from Lake Steamer Lagonda, Which Has Been Converted from an Ore to a Steel-Handling Boat. This shows the large hatches and the locomotive cranes mounted on wide gage trucks



(Below) Unloading Bethlehem Rails from the Lagonda. Two magnets of a special design will handle five to six rails at a time

(Above) Another View of One of the Locomotive Cranes on the Lagonda in Action on a Scrap Pile. In the top view the crane is unloading light material; in this it is handling heavy scrap

Pickands, Mather & Co. fleet of boats. One vessel is employed for this service for transporting steel from Buffalo to upper lake ports and bringing back scrap. In addition to these operations of the Bethlehem Steel Co. this year, several shipments of semi-finished steel in cargo lots of 2500 to 3000 tons have been sent this season from Duluth to Cleveland, where the steel was transferred to cars and shipped to a Pittsburgh district tube mill.

In addition to the shipments by the Bethlehem Steel Co. up the lakes from Buffalo, three cargoes of steel bars have been sent to Cleveland by another Buffalo

producer. Also a round lot of semi-finished steel has been shipped to New England. This was loaded on barges at a Cleveland steel plant and shipped through the New York barge canal. The same barges had brought cargoes of sulphur to Cleveland.

Although cargo shipments of steel rails have been made to Duluth for several years, lake shipments of other rolled products have been handicapped in the past by the absence of adequate dock or boat handling facilities. Dock equipment for bulk freight has been confined largely to ore and coal handling machinery. In the absence of proper handling facilities it took too long to load or unload steel from a boat. An ore bridge was tried for loading a cargo of steel on a boat at a Cleveland mill, but the method was rather slow and unsatisfactory. Considerable steel in car lots and less has been shipped from Lake Erie ports to the Northwest on packet freighters that use the same handling equipment for this material as for other freight.

Two methods have been devised for handling steel in bulk to and from lake boats. One is the provision of handling equipment on the docks and the other is the placing of handling machinery directly in the boats. Both are of interest to builders of cranes and other machinery, as they are developing a broader field for this line of equipment.

Four Steel Corporation Steamers

The United States Steel Corporation was the first steel interest to take up the handling of steel by water on the lakes in a big way. The Isthmian Steamship Line, a Steel Corporation subsidiary, in 1923 put in operation two boats designed especially for handling steel. These are 258 ft. long, being of Welland Canal size, with a capacity of 2100 net tons. These were placed in commission to carry steel east from Lake Michigan and Lake Erie ports for the Canadian trade, their cargoes of finished steel in various forms going to Montreal and other Canadian ports. Each is equipped with two five-ton electrically operated cranes. A description of these boats and their handling facilities appeared in THE IRON AGE Jan. 24, 1924.

That shipping steel in bulk on the lake has proved successful to the Steel Corporation is indicated by the fact that the Isthmian Steamship Line this season began to operate another boat, the Steel Electrician, on the Great Lakes for shipping steel, and is building a fourth, the Steel Chemist, which is expected to go into commission late this season. These boats are duplicates of those previously used, both in capacity and in handling equipment.

The Converted Lagonda

The ship employed by the Bethlehem Steel Co. for shipping finished steel on the Great Lakes is the Lagonda, 360 ft. long, of 4500 tons capacity, being one of the smaller vessels in the fleet of the Interlake Steamship Co. and of a size that has been generally replaced by larger vessels for hauling ore. It was converted from an ore to a steel carrier by taking out the old deck hatches and replacing them with three open hatches of much larger size, so that there is sufficient room for handling steel in long lengths into and out of the hold. The new hatches are 48 ft. long and 26 ft. wide.

The Lagonda is equipped with two locomotive cranes of a standard design, except that the crane structure is mounted on a wide-gage truck running on a track with a 27 ft. 6 in. gage, or of sufficient width to span the hatches. This track extends practically the full length of the boat. The cranes, which were built by the Brown Hoisting Machinery Co., Cleveland, have a 50-ft. boom with 20 tons capacity at a 12-ft. radius and 5 tons capacity at a 50-ft. radius. Lifting magnets are used for handling scrap and rails, and slings are provided for mill products other than rails. At first 55-in. lifting magnets were used for loading and unloading scrap, but these were replaced with 65-in. magnets, because of the character of the scrap handled. The scrap is shipped unclassified and some of it is bulky material. Rail handling magnets are provided for each crane. Instead of using a single magnet for one rail at a time, as is the usual practice in handling rails with magnets, two magnets are attached to a beam on a 10-ft. center and this double magnet lifting unit is capable of taking at one time five or six standard 90 to 100-lb. rails 39 ft. long. The magnets are of a special size, 26 in. wide and 42 in. long, and were built by the Ohio Electric & Controller Co., Cleveland.

The steel as a rule is unloaded directly from the boat to cars along the track. Structural steel up to 60 ft. in length has been shipped on this boat. It requires 18 to 20 days for a vessel to make a round trip from Buffalo to Duluth (taking a cargo of steel and returning with scrap), this including the time spent at each end in loading and unloading. While the boat has not been in operation long enough to determine a definite loading and unloading time, it is expected that this can be scheduled at from four to five days.

The Cleveland Stevedore Co. equipped a dock in Cleveland last spring for handling steel and other products. This company acquired a Pennsylvania Railroad dock at the foot of West Ninth Street, which it rebuilt. A track was laid the length of the dock and a locomotive crane installed. Several cargoes of steel ranging from 2500 to 3000 tons in billets and steel bars have been unloaded on this dock this season, being shipped from Buffalo and Duluth. The crane places the steel directly in cars, so that there is only one handling operation. It can unload steel at a speed of about 50 tons per hr. Billets are handled in a sling and while one sling load of 8 or 10 billets is being moved by the crane a second sling is being adjusted on another bundle of billets.

More recently the Cleveland Terminal & Dock Co. has equipped a 500-ft. commercial dock along the Cuyahoga River, Cleveland, that it has leased from the Pennsylvania Railroad. Charles E. Cole, formerly superintendent of the Pennsylvania ore dock, Cleveland, is manager. The dock is served by two locomotive cranes.

The cranes on the docks of the Cleveland Stevedore Co. and the Cleveland Terminal & Dock Co. are duplicates. They are of 35-40 tons capacity, have 70-ft. booms, line speed of 225 ft. per min. and a travel speed of 300 to 450 ft. per min. They are both equipped with lifting magnets and clam shell buckets. Each has a 10-kw. generator to energize a 55-in. lifting magnet. The cranes were built by the McMyler Interstate Co., Bedford, Ohio, and the lifting magnets by the Ohio Electric & Controller Co., Cleveland.

More Coal on Hand in Industry

Stocks of coal in industry Aug. 1 are reported by the National Association of Purchasing Agents at 37,841,000 tons, a gain of more than 2 per cent above the 36,998,000 tons on July 1 and nearly 12 per cent above the 33,918,000 tons on June 1. Consumption during July is placed at 37,424,000 tons, compared with 35,541,000 tons in June.

Steel plants are reported as having on hand a 24-day supply, compared with 25 days for by-product coke plants, 29 days for railroads, 60 days for electric utilities and coal gas plants and 31 days for other industries.

That employment in iron and steel plants declined in July is indicated by figures of the Bureau of Labor Statistics, which show 284,171 employees in 207 establishments in June and only 279,678 in July, a reduction of 1.6 per cent. Pay roll totals fell off still more, from $8,674,934 (for one week) in June to $8,156,891 in July, a drop of 6.0 per cent. Average weekly wages decreased from $30.53 in June to $29.17 in July, or 4.5 per cent.

A field station has been established by the Massachusetts Institute of Technology at the Bayonne refinery of the Tide Water Oil Co., in connection with a new course in fuel and gas engineering. This is to afford graduate engineers an opportunity for specialized training in processing and utilization of fuels. It contemplates nine months at the Institute, followed by six months' field work at the Bayonne plant and other industrial establishments.

INTERLOCKING ROOF TILE

Open-Hearth Refractory Brick Designed to Prevent Slippage of Broken Units

An interlocking furnace roof tile has been designed and patented by L. S. Longenecker, Bessemer Building, Pittsburgh, refractories engineer. Interlocking is accomplished by the use of a triangular tongue on one face and groove on the opposite face of each tile. The triangle of the tongue and groove has its base on the inner, high-temperature face of the tile and its apex toward the top of the tile. The thickness or offset of the tongue is about ¼ in. and the depth of the groove corresponds. The tongue and groove extend in height about three-quarters of the tile length.

This leaves the remainder of the tile face flat and smooth for carrying the ring or roof load when making suitable allowance for expansion on the inner tile ends. Broken pieces, if of appreciable size, do not slip free or fall out, being prevented from slipping out sideways by the adjacent rings on either side. The groove side cannot slip off the tongue and drop out, as the ring load will cause the tiles to inter-engage. Thus the glazed end, regardless of its broken condition, will continue to serve its refractory purpose.

Tested in Roof with Regular Tile

In a preliminary roof test the service behavior of the tongue and groove tile was compared with that of the conventional smooth tile roof. A fairly representative section of roof was installed of the interlocking tiles. The number of days of service was the usual run, determined by the holes and weak sections in the plain roof. The interlocking section was still good for considerably more service when dismantled along with the smooth tile roof.

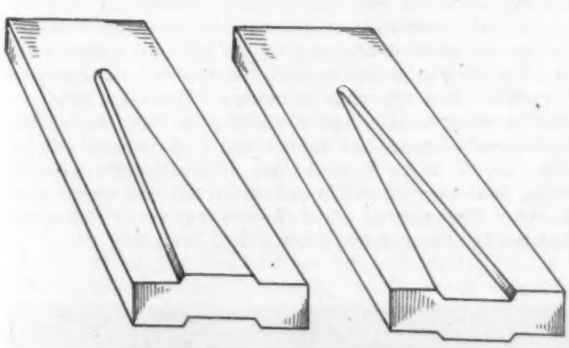
Inspection made of this test roof showed that several tongue-and-groove tiles had slipped out ½ in. or more, but had been held in this position throughout the run. In designing the interlocking tile, a clearance between the tongue and groove was provided, to insure ease of installation and self-adjusting of the ring. The broken ends, therefore, slipped down enough to take up this clearance, and in this position the glazed end was held in place, keeping the surface of the roof smooth and regular.

In charging, some scrap was forced up into the interlocking roof section, pushing several tiles out of position. These tiles immediately settled back into proper alinement and stood up throughout the run. The furnace during this test was cooled down and again reheated. The interlocking section of the roof did not lose a broken tile end nor show any injurious results from the changes in temperature. The plain roof section, however, showed the usual dropping out of tiles.

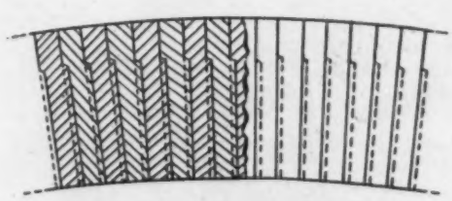
Expansion and Provision to Meet It

To restrict dropping out of tile ends, it is necessary to key a smooth tile roof tightly. When a roof so keyed is brought up to working temperatures, the inner hot tile ends will expand fully and the outer tile ends less. A great part of the expansion in silica brick takes place between 300 and 800 deg. Fahr. This expansion ranges from ⅛ in. to ¼ in. per linear ft. The whole ring or roof load is concentrated on the inner hot tile section, for, as the ring rises, the outer cold tile ends are spread well apart, with no bearing contact. This excessive pinching and squeezing load is too great for safety with hot silica shapes, and sooner or later the internal structure of this exposed furnace surface is crushed and broken, reducing its resistance to flame and gas erosion.

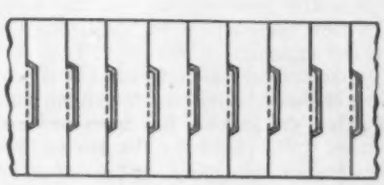
A suspended open-hearth roof test recently made in Ohio showed that, by reducing this item of excessive ring load within a safe margin for hot silica shapes, the roof life could be nearly doubled. When using the interlocking tile roof, suitable expansion space can be allowed on the inner tile ends. In this way the ring load can be caused to center and remain on the outer rigid cold tile ends, thus reducing the load on the semi-soft inner tile ends. This expansion allowance can be secured by using a larger number of suitable wedge shapes. Between the inner tile ends at definite intervals a strip of cardboard can be inserted when installing this roof, properly gaging this allowance.



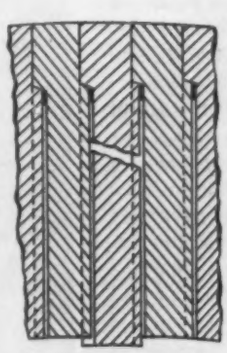
Perspectives of Two Tiles, Showing Both Faces and Indicating How the Tongue and Groove Interlock



Typical Section of a Roof Ring Made of Interlocking Tiles



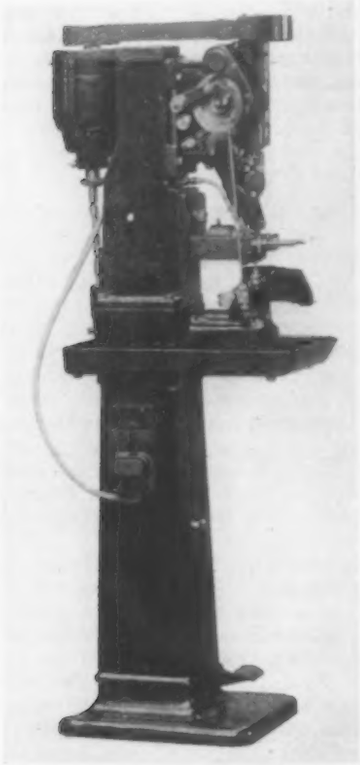
Bottom View of a Ring of Interlocking Tiles, Showing the Clearance in the Lock



What Happens When a Tile Becomes Broken. It is held from dropping completely out by engagement between the tongues and grooves of adjacent tiles

Machine for Rapid Drilling and Burring of Holes in Pins and Other Pieces

The Kingsbury Machine Co., Keene, N. H., is placing on the market the vertical general-purpose type semi-automatic drilling machine here illustrated, which was developed for drilling and burring holes in pins and other pieces. The machine employs the company's standard type drill head previously described in THE IRON AGE. The fixture used is designated as the No. 82 universal fixture and the burring spindle unit is the No. 107.



In operating the machine, the pin or other piece is inserted in the fixture and the treadle is depressed. The work is clamped, drilled, countersunk on the bottom of the hole to remove the burr and then unclamped, all automatically. The work may also be ejected from the fixture automatically. The machines are available with up to five of these units mounted on one bed.

The machine is driven by a heavy-duty ball-bearing motor mounted on the head, the drive being through interchangeable pulleys, which provide a range of speeds up to 7000 r.p.m., with a motor speed of 3500 r.p.m. A Westinghouse starter with BX wiring to the motor is mounted conveniently on the side of the column. A screw is provided for adjusting the feeding pressure to the capacity of the drill, this screw being conveniently located at the left-hand side of the machine. There is also a clamp nut for engaging the automatic feed after the spindle has been adjusted to the proper position. The machine illustrated is equipped with an automatic clamping attachment, a spring plunger for ejecting the finished work, and adjustable V-blocks for work up to ¾ in. in diameter. The oil tank and pump is located inside of the pedestal base.

German vs American Machine Tools in Czechoslovakia

Demand for American tools in the Czechoslovakian market continues slack, owing to the period of business stagnation through which the country is passing, according to a report of James F. Hodgson, commercial attaché, Prague. The manufacturers who have shown the most pronounced decline in purchases of machine tools are those producing sugarmill machinery and agricultural implements. This is explainable in the former case by the unprofitable business of sugar manufacturing companies as a result of the low world price for sugar.

Domestic demand for agricultural implements was dull because of low purchasing power of the agrarian population, as a result of low internal prices for bread grains and cereals. Automobile factories, ordinarily heavy buyers of machine tools, have not been in the market for such equipment during recent months, as, in the latter part of 1925, they covered their requirements for new equipment.

Germany continues the strongest competitor of the United States in the sale of machine tools in the Czechoslovakian market. During recent months representatives of German manufacturers have taken many orders from agents handling American tools, through their lower quotations, particularly on cash transactions.

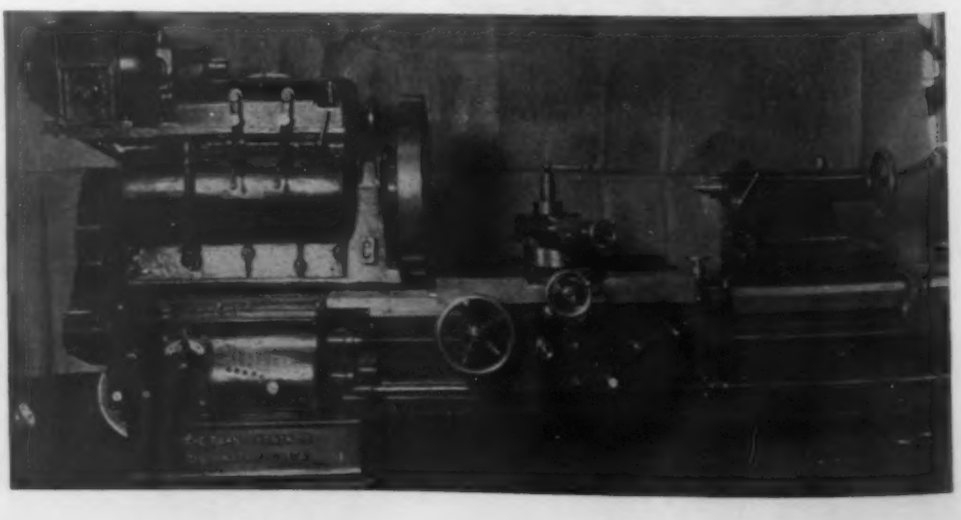
Improves Whitcomb-Blaisdell Planer

Box-type table and bed and forced feed lubrication are among the improvements incorporated recently in the 24-in. Whitcomb-Blaisdell planer of the Reed-Prentice Co., Worcester. There is a gravity oiling system with central station for maintaining an even level of oil in all pockets. The forced feed system lubricates the driving mechanism.

Redesigns Heavy Duty Engine Lathe

Redesigned 30 and 32-in. series F heavy-duty engine lathes with features intended to adapt them for steel mill and railroad work have been added to the line of the Rahn-Larmon Co., Cincinnati.

The machine is of geared-head type and is driven by a 15 hp. motor arranged as shown in the accompanying illustration. Among the improved features is the massive tailstock and the widened carriage. The compound rest has been strengthened and the slide widened. The apron is of double wall type providing two bearings for each stud and a self-oiling device has been incorporated for the rear bearings. The machine has friction cross-feed. Apron control is furnished. The quick-change gear box is arranged to permit cutting from 13/16 to 24 threads per inch through all-steel gears, heat treated and mounted on chrome nickel steel shafts. The geared head has a range of 12 speed changes for the spindle, from 5 to 275 r.p.m.

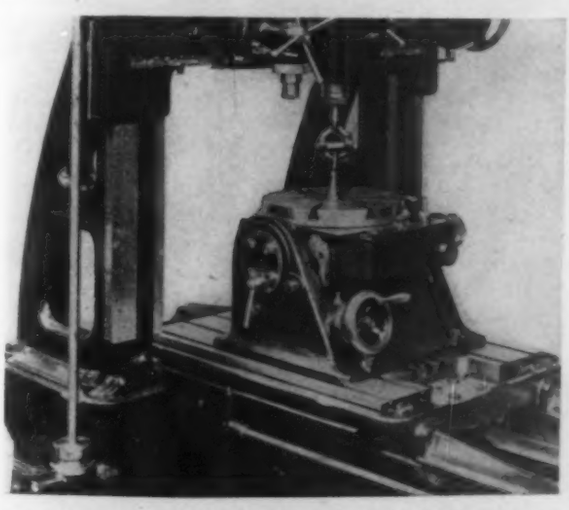


Massive Tailstock and Widened Carriage Are Among Improvements Intended to Adapt the Lathe for Heavy-Duty Work. The change gear box is heavy and incloses heat-treated steel gears and chrome-nickel driving shafts

Universal Table for Precision Jig Boring Machine

Universal circular tables in two sizes for use on the locating and jig boring machines of the Société Genevoise D'Instruments de Physique, Geneva, Switzerland, are being placed on the American market by the R. Y. Ferner Co., Investment Building, Washington, D. C.

The smaller of these, with a dividing table 11¾ in. in diameter, is for use on the No. 4 machine, while the larger, having a dividing table 17¾ in. in diameter, is intended for use on the company's Nos. 5 and 6 machines. By means of these tables, not only can holes be laid out and drilled on workpieces in the



Two Sizes of Universal Table Are Available, for the No. 4 and the Nos. 5 and 6 Jig Boring Machines, Respectively

horizontal plane, but holes may be bored also on different faces of the same piece, either parallel to each other, or radial, or obliquely radial about the central axis of the workpiece.

The dividing table revolves about a central pivot and is provided with a clamping device. The rotation of the dividing table is controlled by means of a worm screw, fitted with a reading drum graduated to 20 seconds, while a vernier permits estimation of one second of arc. The mounting of the dividing table is set on a horizontal axis, and the upper surface of the table may be set to any angle from 0 to 90 deg. This angle is measured by a graduation with a vernier reading to 1 minute of arc. On the No. 4 table the reading is made by means of a magnifying lens. The tilting of the table is accomplished by means of a worm screw. Four clamping keys serve to hold the table at the desired angle. On the No. 5 table fixation pins are provided for holding the table in the horizontal and vertical positions. Special keys are also provided for lining up the fixture on the table of the jig boring machine, so that the horizontal axis is accurately perpendicular to the direction of motion of the table of the machine.

For accurately locating the center of the table with reference to the axis of the machine spindle, a spherical-ended center pin is supplied for insertion in the taper hole of the axle of the dividing table. A level is placed between the spherical end of this pin and a center mounted in the spindle. The distance between the center of the spherical end of the pin and the shoulder of the pin which rests on the dividing table is accurately known, so that in locating the fixture with the dividing table set vertically or obliquely a definite allowance can be made for this distance, in determining the point at which to drill the hole in the workpiece.

To obtain the setting at which to start the hole when the table is in oblique position, it is necessary to make a simple calculation by means of a formula that involves the tangent of the angle at which the table is set, and the specified height of the hole to be drilled above the lower surface of the workpiece. This calculation may be made by the draftsman, so that the workman can locate the holes rapidly.

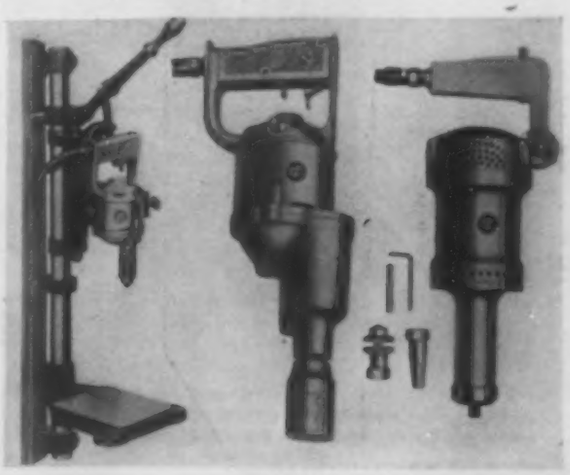
When holes are to be located on the side of a workpiece, such as on the faces of a hexagonal piece, two methods of determining the point for boring are available. The first method is the use of the spherical-ended center-pin and level, and the other is by clamping the work directly to the table in the vertical position and locating the upper surface of the workpiece beneath the spindle by means of a reference square and prismatic microscope, supplied as an accessory.

Add to Line of Electrical Tools

Recent additions to the line of the United States Electrical Tool Co., Cincinnati, include a die grinder, a portable tapper and a type Q post bracket, all of which are shown in the accompanying illustrations.

The die grinder is adapted for the grinding of dies, welded parts, fins on light castings and other pieces requiring rapid and accurate grinding. It operates on direct and alternating current and the speed under load is 11,000 r.p.m. Ball bearings are employed throughout. The back handle is adjustable to permit of operation in close quarters. Special adapters furnished to accommodate wheel 3 x ⅜ x ½ in. and 1¼ x 1¼ x ¼, respectively. The machine measures 4½ x 17½ in. and the weight is 12 lb.

The portable tapper, which also operates on direct and alternating current, is arranged so that the chuck reverses automatically when the operator pulls back on the machine. When tapping, the chuck has positive engagement; when extracting the tap, the engagement is by friction clutch, this feature being stressed as eliminating tap breakage. Two sizes of the machine, designated as the Nos. 1 and 2, are available. The capacity of the smaller tapper is 5/16 in. in iron, 3/16 in. in steel and ⅜ in. in aluminum or brass. The capacity of the No. 2, in the order named, is ⅝, ¼ and ½ in. The load speed in both cases is 200 r.p.m., but machines



The New Die Grinder Is Shown at the Right and the Post Bracket at the Left. The chuck of the portable tapper (center) reverses automatically

with spindle speeds of 500 r.p.m. or more are available. The No. 1 machine weighs 7¾ lb. and the No. 2, 9 lb.

The new post bracket, designated as the type Q, is adapted for use with the company's ¼ and 5/16 in. drills and also with the portable tappers described above. The bracket is designed to eliminate the use of adapters, the drill or tapper being merely clamped in the vee-like vise grip as shown, providing a convenient and accessible mounting for the tool.

The Ludlum Steel Co., Watervliet, N. Y., is planning to change over the remainder of its melting furnaces from manual to automatic electric control. This company uses electric furnaces of its own patented design, featuring a movable hearth.

New Portable Floor-Type Universal Saw

A universal motor-driven saw mounted on a cast-iron pedestal and arranged for portable use has been added to the line of the Gallmeyer & Livingstone Co., Grand Rapids, Mich.

The base of the machine is equipped with two rollers at the back and two stationary feet at the front to provide a firm setting on the floor when the machine is in operation. When it is desired to move the machine, the handle at the front is pulled forward. This causes a cam to raise the feet from the floor, bringing the weight of the front of the machine onto a third roller, which is carried on a swivel bearing and moves with the handle.

The motor and all working parts are mounted in the upper part of the machine, providing a self-contained outfit. The upper works may be removed from the pedestal and the machine used as a bench type unit, if desired. Either a ½-hp. repulsion induction type motor to operate from lamp socket or with a 1-hp. repulsion induction type motor to operate from upper line can be provided. When equipped with a power line motor and 8-in. diameter saw, the machine will handle stock up to 12-in. wide by 2½-in. thick. The motor is belted to the saw arbor, the latter being mounted

The Table May Be Tilted and Locked at an Angle. The upper works may be removed from the pedestal and the machine converted to bench type saw

in ball bearings. The switch for starting and stopping the machine is conveniently located at the front as shown, which removes temptation to let the machine run when not needed.

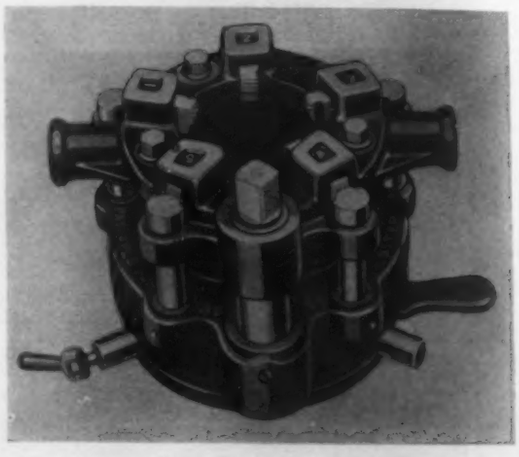
The table is a one-piece casting 25 x 26 in. and is fitted with a removable throat plate to permit the use of dado heads, cope heads, grooving saws, etc. The saw can be raised from flush with the table to 2½ in. above the table, which permits cutting of 2½ in. stock. The table may be tilted at an angle up to 45 deg., as shown in the illustration, and can be locked at the setting desired.

The blade is suitably guarded, and a splitter guard is provided. The cross cut gage can be used on either side of the saw and can be set quickly at any angle and clamped rigidly in position. Holes are provided for mounting an auxiliary wood face piece when desired. The ripping gage is machined on both sides and can also be used on either side of the saw. Tightening of the lever head screws locks the ripping gage in position and automatically lines it up with the saw at the same time.

Die Stock for 2½ to 4-In. Pipe

Ease of threading is claimed for the die stock here shown, which is known as the No. 44 Receder and is being placed on the market by the Oster Mfg. Co., Cleveland. The tool is intended for threading pipe ranging from 2½ to 4 in. in diameter.

The free cutting of the tool is attributed in part to the use of narrow dies which are ground with long lead and sharp rake. The tool is geared and is fur-



Gearing and a Ratchet Handle Permit One Man to Cut 4-In. Pipe

nished with a ratchet handle. The leader screw, which starts the dies on the pipe and pulls them along, is provided with a patented chip shield. This shield serves to keep the leader screw free of dirt and chips, thus facilitating operation of the tool and preventing undue wear of the screw. Oversize and undersize threads may be cut with the tool, a simple rotary movement of the die head adjusting the dies to cut either deep or shallow threads. A lever-operated, self-centering chuck is used, eliminating the necessity of changing pipe bushings for various sizes of pipe.

Spindle Book for Chuck Users

An unusual publication of 96 pages has been put out by the Jacobs Mfg. Co., Hartford, Conn., producer of drill chucks. Lack of standardization among the numerous manufacturers of stationary and portable drilling machines, as well as tapping machines and attachments, lathes, screw machines and centering machines, resulted in the accumulation by the Jacobs organization of a large amount of data regarding the spindle specifications of scores of manufacturers. Compilation of this information in this book, covering the requirements of the different types of machines put out by nearly 200 separate plants, gives in convenient form the type of spindle, number and character of taper or type of chuck suitable for each case. The number of separate tools covered runs close to 1000.

While manufacturers have not begun, in a large way, to standardize on tapers for their spindles, nevertheless this compilation should be a large help along that line to such as take it up. There is a complete index of the manufacturers, with cross index of the trade names of their particular products covered, while enough illustrations are given to explain points brought out.

Electric power production by public utility plants in the United States in July is reported by the Geological Survey at 5901 million kwhr., compared with 5873 in June and 5809 in May. The gain over July, 1925, was 10 per cent. About two-thirds of the total was produced by fuels, this proportion being much higher than in the spring months of copious water supply for hydraulic power.

MOTOR DRIVE FOR RAIL MILL

Rapid Change in Substituting for Steam Drive at Steelton, Pa.

During the month of July the engines driving the rail mill at the Steelton plant of the Bethlehem Steel Co., Steelton, Pa., were replaced with motors, completing the electrification of this group of mills which began with electrifying the drive of the blooming mill in December, 1920.

The rail mill which takes blooms approximating 9 in. square from the blooming mill through reheating furnaces consists of a 35-in. two-high roughing stand in which the bloom is given five passes, and two 28-in. three-high stands in which five more passes are made, completing the finishing of the rail except for special sections.

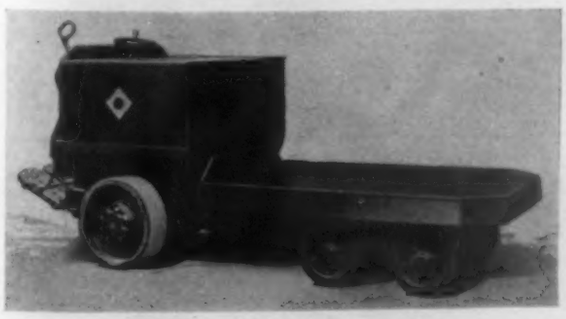
The 35-in. mill has been driven by a Southwark twin simple 40 x 48-in. engine built about 1885 and moved to this location from another mill when the present rail mill was built about 1913. The two 28-in. stands have been driven by a twin tandem compound 30 and 60 by 54-in. engine built about 1906 for the plant of Milliken Brothers on Staten Island and moved to Steelton in 1913, when much of the rest of the Milliken equipment was also transferred. Both engines have exhausted into the same condensor.

The reversing engine driving the 35-in. mill has been replaced by a 3500-hp. 500-volt, direct current reversing motor supplied with power from the general system through a motor generator set located in the motor room, and the engine driving the 28-in. non-reversing mill has been replaced by a 4000-hp. continuous rating 6600-volt, 25-cycle, 8-pole slip ring induction motor with a synchronous speed of 375 r.p.m. On the same base with the motor is mounted a steel plate flywheel 14 ft. 7 in. in diameter by 11 in. thick, weighing approximately 75,000 lb., and this in turn is coupled to a gear reduction set with a ratio of 24 to 102, thus giving the mill a speed of 85 to 90 r.p.m. This motor and the steel plate flywheel are both duplicates of the motor and flywheel driving the motor generator set which supplies power to the reversing motor for the 35-in. mill.

All the electrical equipment was designed and built by the General Electric Co. and the gear reduction set was designed and built by the Bethlehem Steel Co. at its Bethlehem plant. The last rail rolled by the mill with the engines driving it was on the afternoon of July 3 and the first rail rolled with the new motor drives was on July 31, just four weeks later.

Develops 10-Ton Electric Lift Platform Truck

A 10-ton lift platform truck adapted for the handling of sheet steel to and from railroad cars, molten metal, ladles, mill rolls, pig iron and heavy machinery and parts, has been brought out by the Elwell-Parker Electric Co., Cleveland.



Working Parts of Alloy Steel Are Incorporated to Provide the Necessary Strength and Keep Down Weight

In order to conserve battery capacity, the weight of the machine has been kept down and the necessary strength of working parts maintained by the use of alloy steel. The weight of the truck is 6100 lb., complete with batteries. The platform is of steel, and is 72 in. long, 40 in. wide and 18½ in. high. The lift is approximately 3½ in., and machine travels at the rate of 300 to 400 ft. per min.

Power is delivered to the motors through drum-type controllers of a new design. The lifting mechanism, located beneath the battery, consists of a motor direct-connected to a single worm reduction with a nut built into the hub of the worm wheel. A forged lift ram travels in and out of this nut, lifting and lowering the load. The platform is supported by two bushed rockers or links on the main center sills at the battery end and by an H-link beneath the forward end.

The trail axle carries four wheels, each fitted with two differentiating tires to provide proper creep when being steered. These wheels steer simultaneously and concentrically with the two larger drive wheels. The four wheels are mounted in tapered roller bearings and are fitted with 15 x 8½-in. solid rubber tires. The driving wheels are of disk type and have 7-in. double row ball bearings and 22 x 6-in. solid rubber tires. The truck is steered by a hand wheel through miter and worm gears supported on radial or thrust ball bearings.

The lifting motor has an electro-mechanical brake, and its controller is operated by a lever which is automatically tripped when the platform reaches its upper and lower limits. The main travel controller is of a new design. If the operator steps off, the power is cut off and the brake applied automatically. Both the lifting mechanism and the main drive are removable as units. The brake drum is of alloy steel and drop forged.

Safety Court Reduces Accidents

A reduction in the number of accidents from 30 or more a month to four has been effected at the plant of the Newport Rolling Mill Co., Newport, Ky., by the establishment of a "safety court," which tries employees accused of carelessness. A safety judge having no immediate contact with any of the company's workmen presides over the court, while fellow employees act as prosecuting attorneys. After the judge has rendered his decision, an appeal can be taken to a reviewing board, consisting of the general superintendent, the assistant to the president of the company and the superintendent of the galvanizing department.

Offenders convicted by the court are sentenced on a day basis. At the end of a year an employee is automatically discharged if his assessed fines or penances total 100 days. Careful watch upon the observance of safety rules is kept by a group of workmen appointed safety inspectors by the general superintendent. Carelessness on the part of any employee is reported to the general superintendent, who in turn notifies the foreman of the department in which the man is working. The offender is then instructed to appear before the safety court. Names of the safety inspectors are not divulged.

Various types of special steels used in the construction of an engine lathe are shown in a drawing which is a feature of a booklet just published by the Crucible Steel Co. of America, 17 East Forty-second Street, New York, on its "Max-el" machinery steel. Data and graphs showing the tensile strength of steel of varying analyses and treatment are given. The booklet, consisting of 32 pages and cover, describes the analyses of its various grades of machinery steel and suggests uses to which it may be put.

Large Production of Pig Iron in Half Year

First Six Months Exceeded Only by First Half of 1923 and Second Half of 1918

OFFICIAL figures of the American Iron and Steel Institute show pig iron production for the first half of 1926 at 19,679,737 gross tons, of which 19,602,376 tons represents coke pig iron and 77,361 tons charcoal pig iron.

Ferroalloys to the extent of 336,345 tons bring the

HALF-YEARLY OUTPUT OF PIG IRON AND FERRO-ALLOYS BY STATES.

HALF-YEARLY PRODUCTION OF PIG IRON BY STATES.*

States.	Blast furnaces, June 30, 1926. In.	Out.	Total.	Production of pig iron, not including ferro-alloys—Gross tons. First half of 1925.	Second half of 1925.	First half of 1926.
New York	15	12	27	1,095,584	975,270	1,329,074
New Jersey	0	3	3			
Pennsylvania	67	54	121	6,525,784	5,713,992	6,861,089
Maryland	5	1	6	334,062	351,600	408,126
Virginia	1	15	16	61,194	52,387	40,580
Alabama	23	14	37	1,430,973	1,384,715	1,442,882
Texas	0	1	1			
West Virginia	2	2	4	315,395	335,088	241,321
Kentucky	1	4	5			
Mississippi	0	1	1			
Tennessee	1	12	13	39,867	55,663	47,315
Ohio	48	17	65	4,479,076	4,288,696	4,618,238
Illinois	17	8	25	2,008,260	1,595,995	1,836,875
Indiana	17	1	18	2,096,004	2,023,807	2,277,593
Michigan	9	3	12			
Wisconsin	2	4	6	207,336	261,143	266,459
Minnesota	2	1	3			
Missouri	0	3	3			
Colorado	2	3	5	258,092	226,328	310,185
Utah	1	0	1			
Total	213	159	372	18,851,627	17,264,684	19,679,737

HALF-YEARLY PRODUCTION OF COKE PIG IRON BY STATES.*

New York	15	11	26	1,095,584	975,270	1,329,074
New Jersey	0	3	3			
Pennsylvania	67	†53	120	6,525,784	5,713,992	6,861,089
Maryland	5	1	6	334,062	351,600	408,126
Virginia	1	15	16	61,194	52,387	40,580
Alabama	23	11	34	1,423,857	1,377,488	1,437,069
Texas	0	1	1			
West Virginia	2	2	4	315,395	335,088	241,321
Kentucky	1	4	5			
Tennessee	1	9	10	33,512	42,780	47,315
Ohio	48	17	65	4,479,076	4,288,696	4,618,238
Illinois	17	8	25	2,008,260	1,595,995	1,836,875
Indiana	17	1	18			
Michigan	4	0	4	2,012,343	1,944,885	2,206,045
Wisconsin	2	3	5			
Minnesota	2	1	3	207,336	261,143	266,459
Missouri	0	2	2			
Colorado	2	3	5	258,092	226,328	310,185
Utah	1	0	1			
Total	208	†145	†353	18,754,495	17,165,652	19,602,376

HALF-YEARLY PRODUCTION OF CHARCOAL PIG IRON.*

New York	0	1	1			
Pennsylvania	0	1	1			
Alabama	0	3	3			
Tennessee	0	3	3	97,132	99,032	77,361
Mississippi	0	1	1			
Michigan	5	3	8			
Wisconsin	0	1	1			
Missouri	0	1	1			
Total	5	14	19	97,132	99,032	77,361

HALF-YEARLY PRODUCTION OF ALL KINDS OF FERRO-ALLOYS BY STATES.‡

New York	0	0	0			
New Jersey	0	0	0	57,348	59,531	64,250
Pennsylvania	7	5	12	125,437	158,272	174,566
Maryland	0	0	0			
Virginia	1	0	1			
West Virginia	0	0	0	38,673	8,988	20,230
Tennessee	0	1	1			
Alabama	1	0	1			
Ohio	2	2	4	72,665	63,341	77,299
Iowa	0	0	0			
Total	*11	8	†19	294,123	290,132	336,345

TOTAL PRODUCTION OF PIG IRON AND FERRO-ALLOYS ACCORDING TO FUEL USED.

Coke pig iron	208	†145	†353	18,754,495	17,165,652	19,602,376
Charcoal pig iron	5	14	19	97,132	99,032	77,361
Total pig iron	213	159	372	18,851,627	17,264,684	19,679,737
Total ferro-alloys	*11	8	†19	‡294,123	‡290,132	‡336,345
Grand total	224	167	391	19,145,750	17,554,816	20,016,082

* Does not include the production of ferro-manganese, spiegeleisen, ferro-silicon, or other ferro-alloys.
† Includes 1 idle anthracite coal and coke furnace.
‡ Includes ferro-manganese, spiegeleisen, ferro-silicon, and other ferro-alloys made in blast furnaces or in electric furnaces.
* During the first half of 1926 there were 18 blast furnaces in operation making ferro-alloys only or ferro-alloys and pig iron.
† Blast furnaces only; electric furnaces not included.

HALF-YEARLY OUTPUT OF PIG IRON BY GRADES AND FERRO-ALLOYS BY KINDS.

HALF-YEARLY PRODUCTION OF BASIC PIG IRON.

States.	First half of 1925.	Second half of 1925.	First half of 1926.
New York	478,880	338,542	533,272
Pennsylvania—Allegheny County	1,867,993	1,532,210	2,051,375
Other counties	2,004,579	1,898,670	2,222,357
West Virginia, Alabama, Kentucky	889,341	920,883	911,818
Ohio	2,065,215	2,156,599	2,063,936
Indiana, Illinois	2,710,902	2,257,790	2,658,426
Michigan, Minnesota, Colorado, Utah	283,467	262,299	370,271
Total Gross tons.	10,300,387	9,366,993	10,811,455

HALF-YEARLY PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON.

Pennsylvania	2,000,914	1,790,501	1,951,994
New York, Md., West Virginia, Tenn., Ala.	565,063	649,329	633,835
Ohio	1,693,303	1,562,400	1,742,249
Indiana, Illinois, Wisconsin	602,788	555,163	655,474
Total	4,862,068	4,557,393	*4,983,552

* Includes 145,467 tons of low-phosphorus pig iron.

HALF-YEARLY PRODUCTION OF FOUNDRY PIG IRON.

New York	392,724	280,184	497,129
Pennsylvania	503,059	439,875	533,089
Maryland, Virginia, Kentucky, Tenn.	125,995	114,515	107,246
Alabama	705,671	632,521	683,659
Ohio	378,266	287,624	431,122
Illinois	204,639	216,611	223,594
Michigan	279,809	215,294	226,372
Wisconsin, Minnesota, Colorado, Utah	146,792	160,166	165,023
Total	2,736,955	2,446,790	2,867,234

HALF-YEARLY PRODUCTION OF MALLEABLE PIG IRON.

New York	104,018	91,147	117,747
Pennsylvania	51,192	37,823	54,457
Ohio	255,477	256,130	332,266
Indiana, Illinois, Mich., Wis., Minn.	330,191	427,658	368,804
Total	740,878	812,758	873,274

HALF-YEARLY PRODUCTION OF FORGE PIG IRON.

New York, Pennsylvania, Virginia	80,887	13,508	50,531
Alabama	23,682	20,450	13,214
Ohio	80,378	19,747	36,034
Total	184,947	55,705	99,779

HALF-YEARLY PRODUCTION OF MISCELLANEOUS GRADES OF PIG IRON AND DIRECT CASTINGS.

New York, Pennsylvania, Alabama	8,851	6,557	8,664
Ohio	6,437	6,196	12,631
Indiana, Illinois, Michigan, Wisconsin	11,104	12,292	23,148
Total	26,392	25,045	44,443

HALF-YEARLY PRODUCTION OF FERRO-ALLOYS BY KINDS.

Ferro-manganese	131,560	128,469	150,855
Spiegeleisen	31,384	34,371	41,890
Ferro-silicon	116,175	110,297	122,057
Ferro-phosphorus and all other ferro-alloys	15,004	16,995	21,543
Total	294,123	290,132	336,345

PIG IRON AND FERRO-ALLOYS MADE FOR SALE OR FOR USE OF MAKERS IN THE FIRST HALF OF 1926.

Pig iron and ferro-alloys.	For sale.	For maker's use.	Total. Gross tons.
Pig Iron:			
Basic	959,429	9,852,026	10,811,455
Bessemer and low-phosphorus	312,217	4,671,335	4,983,552
Foundry	2,582,601	284,633	2,867,234
Malleable	769,052	104,222	873,274
Forge or mill	27,731	72,048	99,779
White and mottled, direct castings, etc.	20,414	24,029	44,443
Total pig iron	4,671,444	15,008,293	19,679,737
Ferro-alloys:			
Ferro-manganese	46,867	103,988	150,855
Spiegeleisen	41,890		41,890
Ferro-silicon	122,057		122,057
All other ferro-alloys	21,164	379	21,543
Total ferro-alloys	231,978	104,367	336,345
Total pig iron and ferro-alloys	4,903,422	15,112,660	20,016,082

In This Issue

Careless workmen "tell it to the judge."—A "safety court" for trying violators of the safety code has reduced the number of accidents in a Kentucky steel mill 87 per cent.—Page 713.

Steel conveyor belt prevents side spillage of molding sand.—Chicago steel foundry's main conveying belt, 600 ft. long, 16 in. wide, permits sand to be diverted to individual hoppers for molding machines by means of plows.—Page 704.

Confidence which competitive manufacturers repose in Bureau of Standards of great value in solving metallurgical problems.—Absence of selfish motive enables the bureau to secure information for use in its researches which would not be available to a private investigator.—Page 676.

When making patterns for manganese steel castings be sure to allow enough for shrinkage.—Manganese steel contracts about twice as much as common foundry steel.—Page 677.

American machinery sales abroad are steadily climbing.—From a 9.1 million dollar monthly average in 1922, sales have mounted to an average of close to 13 million dollars per month in 1926.—Page 702.

Cut steel transportation costs by using the Great Lakes.—Boats and docks, specially equipped for handling steel, are enabling producers to get below rail rates.—Page 706.

Exceptional wearing qualities of manganese steel are due to its peculiar power of hardening during use.—Brinell hardness is only about 200, and under the first cuts of a file the steel acts as if it had a soft skin, but when put into use the surface wear creates exceptional hardness in the under layer.—Page 678.

Iron and steel industry employment fell off in July.—Government figures reveal that number of workers was 1.6 per cent below June, while wages declined 4.5 per cent.—Page 708.

Life of open-hearth roofs may be lengthened by the use of tongued and grooved tiles.—Stand up well under test. Pieces will not fall when tiles are broken unless the fragments are small.—Page 709.

German machine tool builders are quoting low for cash business.—American builders are being undersold in Czechoslovakia on desirable orders.—Page 710.

In selecting the best metal for a given purpose, direct manufacturing cost is not the prime consideration.—Quality of service to the consumer should be the first thought. "That which serves well should be used much and, being used much, the manufacturer should derive an ultimate benefit from mass production which might far outweigh small differences in the cost of materials."—Zay Jeffries.—Page 718.

August pig iron output was less than 1 per cent below July.—With a production averaging 103,241 tons per day, last month was the best August since 1923. Furnaces in blast Sept. 1 were 57.7 per cent of the total.—Page 724.

New process is said to produce a superior sheet for enameling purposes.—Manganese content is kept below 0.025 per cent. The finished sheet, ready for enameling, has a peculiar condition of oxide of iron, said to give exceptionally satisfactory fusion with vitreous enamel.—Page 719.

Industry's coal pile 2 per cent larger.—Aug. 1 stock on hand was close to 38 million tons, about a month's supply, Purchasing Agents Association's investigation reveals.—Page 708.

Large feeders necessary for producing flawless manganese steel castings.—Some foundries use smaller feeders than for ordinary castings, which is dangerous owing to the tendency of manganese steel to pipe excessively.—Page 677.

Molding sand storage tank is divided into two compartments.—This permits sand in half the bin to cool and season while sand is being drawn from the other half.—Page 704.

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Foundry Convention to Be Featured Next Week

STEEL treaters and others who will attend the annual convention of the American Society for Steel Treating in Chicago, Sept. 20-24, will be interested in the complete information given in this issue on the exhibits, with names of all companies, products they will show and representatives who will attend. About 175 portraits of officers and representatives of exhibiting companies are also shown.

The next issue of THE IRON AGE, Sept. 16, will treat similarly the convention of the American Foundrymen's Association, to be held the week of Sept. 27 in Detroit. From these two issues visitors at the conventions of steel treaters and foundrymen will be able to check in advance the exhibits they wish to see and the men they desire to make a point of seeing. Reprints of the special sections devoted to the two conventions will be available at THE IRON AGE booth at each show.

For News Summary See Reverse Side

total of pig iron and ferroalloys to 20,016,082 tons. In the 336,345 tons are ferromanganese, ferrosilicon, spiegeleisen and other ferroalloys made in blast furnaces or in electric furnaces. During the first half of 1926 there were 18 blast furnaces in operation making ferroalloys only or ferroalloys and pig iron.

This is the third largest half-year total ever recorded. In the first half of 1923 the output was 21,016,475 tons; in the second half of 1918 it was 20,826,914 tons.

Production of pig iron represented a gain of 4.4 per cent over the corresponding figures for the first half of 1925, which were 18,851,627 tons. The gain over the second half of 1925 was 14 per cent, production in that half having been 17,264,684 tons. Of the total, 4,671,444 tons was made for sale and 15,008,293 tons, or 76.2 per cent for the use of the maker. All of the spiegeleisen and ferrosilicon, amounting respectively to 41,890 tons and 122,057 tons, was made for sale. Of the ferromanganese, however, 103,988 tons of the total production of 150,855 tons was made for the use of the producer.

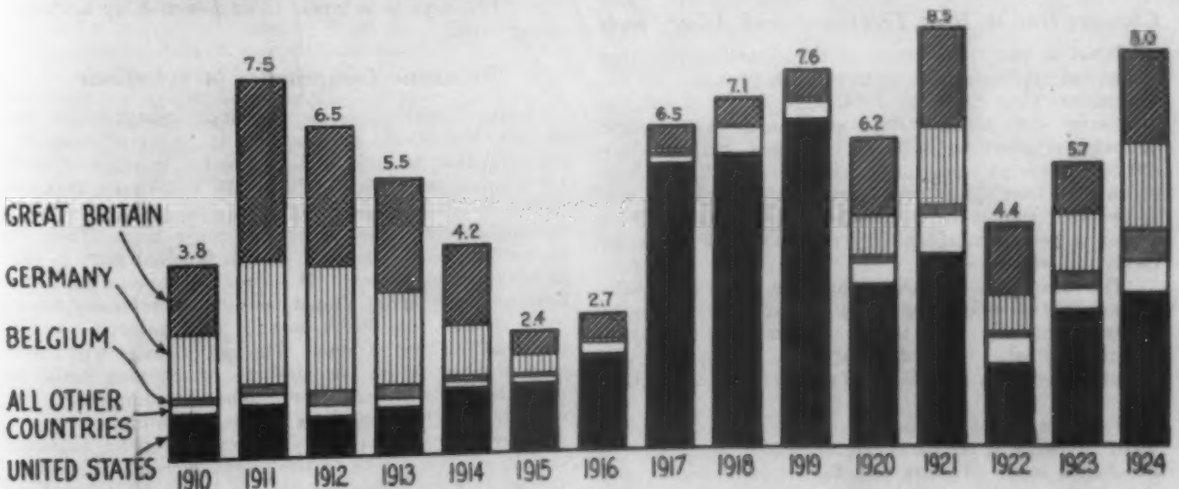
Foundry pig iron recorded a definite gain over each half of last year, the total having been 2,867,234 tons, compared with 2,736,955 tons in the first half of 1925 and 2,446,790 tons in the second half. Production of ferroalloys showed a similar gain, the total of 336,345 tons, comparing with 294,123 tons and 290,132 tons in the two halves of 1925. Particulars are shown in the tables.

MACHINERY INTO CHILE

United States Share Has Grown from 12 Per Cent in 1912 to 44 Per Cent in 1920-24

While Great Britain in 1910 to 1913 inclusive furnished 42 per cent of the industrial machinery imports of Chile, and the United States furnished only 17 per cent, this ratio has been turned about by the developments of the war and post-war periods. From only 12 per cent in 1912 American participation advanced rapidly to a maximum of 89 per cent in 1917. In 1918 and 1919 these huge proportions were retained substantially, with 85 and 87 per cent respectively.

Beginning with 1920, when a new alinement became possible, the United States has averaged 44 per cent of all the industrial machinery imports of Chile, while Great Britain has averaged 25 per cent of the total.



Imports of Industrial Machinery into Chile for 15 Years. Figures at top of columns are millions of (United States) dollars. Disregarding the war period as abnormal—the United States is supplying both a much larger quantity and a larger percentage of Chile's requirements than in pre-war years

Volume of Machinery Imported

Figures for 1924, the latest now available, show that Chile's imports of industrial machinery were $7,973,563, the largest, except for 1921, in the past 15 years. Of this total the United States furnished $3,040,163, or 38 per cent. Great Britain was second, with $1,920,871, or 24 per cent and Germany third, with $1,694,707, or 21 per cent. Belgium was fourth.

Although the United States has for many years supplied the bulk of Chile's mining machinery and equipment, British and German competition has been increasingly severe. Not only in mining machinery is the United States firmly established. Other industrial machinery shipped to Chile in 1925 amounted to $3,463,413, or nearly 90 per cent more than the $1,825,141 shipped in 1923. These 1925 shipments of industrial machinery, other than mining and pumping, show a considerable increase over the total of all industrial machinery imported by Chile from the United States in 1924. The total of American exports of industrial machinery to Chile in 1925 was $4,229,852, a gain of 39 per cent over 1924.

Japanese Pig Iron Producers Form Selling Syndicate

The Pig Iron Joint Sales Guild, which will fix prices of pig iron by mutual agreement to prevent further recessions in the market, has been formed in Japan by the Anshan Steel Works, the Penchihu Colliery Co., the Kamaishi Mining Co., the Kenjiho works of the Mitsubishi Co. and the Wanishi Mining Co., according to reports received by the Department of Commerce. The total tonnage of pig iron which will be offered by these members during the rest of this year is estimated at about 200,000 tons. The guild will act only in the establishment of prices, sales continuing under supervision of the controlling companies, such as Mitsui & Co. and the Mitsubishi Trading Co.

Operation of its new seamless tube mills and its tin plate plant at Indiana Harbor, Ind., will add 1000 employees to the forces of the Youngstown Sheet & Tube Co. Many women will be employed in the tin mills. The company now employs 25,000 workers at its various properties, located in eight States.

Schedule of the next installments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: Sept. 16—Activity in Steel Consuming Industries; Sept. 23—Position of Iron and Steel Producers; Sept. 30—General Business Outlook.

Selecting the Best Metal or Alloy*

The Engineer's Problem and Some Suggestions How to Meet It—Expansion in Heat Treatment and Alloy Steel—Economic Compromises Necessary

THERE are two changes going on within the iron and steel industry which are of great interest to the engineer because they are largely due to his activities. Each year there is a larger proportion of the steel production subjected to heat treatment. Automotive production has been a tremendous stimulus in this direction, but the increase is not by any means confined to that industry; it is general. Stark[1] has estimated that in 1924 there were from 3,000,000 to 3,500,000 gross tons of steel heat-treated in the United States.

The other change is in the production of alloy steel. In 1909 there was one ton of alloy steel produced for every 131.6 tons of total steel in the United States. In 1924 there was one ton of alloy steel produced for every 18.7 tons of total steel produced.[2] The amount of alloy steel produced in 1924 in the United States alone was over 2,000,000 tons. Whereas the total steel production of the United States was about 56 per cent greater in 1924 than in 1909, the alloy-steel production was about 995 per cent greater in 1924 than in 1909. Stating these facts in another way, the alloy steel industry in the United States has grown during the last 15 years about 18 times as rapidly as the total steel industry.

Changes Due to Heat Treatment and Alloy Steels

What is the significance of these statistics? Our industrial civilization is undergoing a change. In the Commerce Year Book for 1924, page 395, is found the following statement: "Railroad tonnage and freight tonnage originating have not changed greatly since 1913." There is being produced relatively less rolling stock with iron alloy wheels running on steel rails and more with rubber tires running on pavement. More power is being transferred by electrons and less, relatively, on wheels.

The electrical and communication industries have grown to immense proportions. Radio seems to be fairly well launched and the aircraft industry is striving for recognition. The effect of these changes on the metal industry is manifold. Two main changes stand out.

First, in all of the industries means are being devised to make a pound of metal render more service. Steel rails made 30 years ago, for example, would wear out quickly under modern high-speed and heavy-duty conditions. Modern rails will carry more pounds of freight per pound of steel. More electrical energy is transmitted through a given weight of wire by the use of higher voltages.

Second, as industry becomes more complicated there is a greater demand for metals and alloys with various special properties. Since iron represents only one element and since there are a number of non-ferrous metals available, it is not surprising that the latter should be found capable of fulfilling an increasing proportion of these special requirements.

Selecting the Best Metal or Alloy

One of the great problems of the engineer is the selection of the best material for a given purpose. It has been estimated that more than 5000 metals and alloys of different chemical composition are in use. In some instances the same compositions are used in the form of castings and in the worked condition. Worked metals of a given composition are produced with a variety of physical properties, depending upon the type of heat treatment and the degree of strain hardness imparted by cold work. Either cast or worked metals may be subject to a substantial change of properties by heat treatment, and in many cases a number of separate heat treatments may be applied to a material of a given composition. Various methods of casting and working impart different characteristics to a metal. With such complexity it might seem almost hopeless to select the best metal for a given purpose.

The selection is a most complex problem. In many instances there is only one base metal deserving of consideration because of the cost, quantities available, shapes and sizes, and properties required. One does not need engineering training to determine that steel is the proper material for rails. Engineering experience is required, however, to select the proper kind of steel and the proper treatment so that the rails will have suitable integrity and life. For certain electrical purposes copper is as obvious a selection as steel is for rails.

But in other instances the engineer must make his selection from two or more metals. Assuming that several materials will function suitably in service, the selection should be made on the basis of ultimate economy. This may be referred to as selection by economic compromise.

Economic Compromise in Selections

Some factors in the economic compromise are obvious, but others are subtle. It seems obvious, for example, that brass should be selected in place of steel for a small part requiring so much machining that the saving in cost of machining of the brass together with the higher sale price of borings more than offsets its higher first cost—the cost of the finished part is less in brass than in steel. It is not so obvious to some, however, that brass should be selected in many cases, even though the direct cost of the finished part is greater than that of steel. The use of brass will result in a greater output per machine, which may result in the production of a greater number of completed units of which the brass piece is a part. The increased production of completed units may result in an economy out of all proportion to the slight increase in cost of the brass as compared to the steel piece. It has been my observation that the most successful manufacturers take advantage of these subtle economic compromises.

But the selection of material is even more important from the standpoint of the quality of service to the consumer than it is in the direct manufacturing cost. Here the economic compromise must take into consideration that which will behave best in service. That which serves well should be used much and, being used much, the manufacturer should derive an ultimate benefits from mass production which might far outweigh small differences in the cost of materials.

The Engineer's Task

What is the engineer doing today to approach more nearly the ideal economic compromise in the selection of materials? One has only to visit a number of modern factories to be impressed with the tremendous amount of testing that is now going on. Usually a machine is unsatisfactory because of a few weak features, and most of the experimental effort is directed toward strengthening these parts. The various parts of a machine are tested separately, and the assembled device is tested as a unit. Both laboratory and use tests are made. The result of all these tests is a more thorough understanding of the requirements for a given purpose and a better selection and adaptation of the materials. The engineer of today is better able to approach the ideal economic compromise in the selec-

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*From the Robert Henry Thurston lecture delivered before the American Society of Mechanical Engineers at its annual meeting by Dr. Zay Jeffries, research metallurgist Aluminum Co. of America, Cleveland.

[1] "The Proportion of Heat-Treated Steel to Total Production," C. J. Stark. A.S.S.T. September Meeting, 1925.

[2] Edwin F. Cone, THE IRON AGE, Sept. 3, 1925.

tion and use of material than was the engineer of yesterday.

The engineer is confronted with a difficult talk in the adaptation and selection of metals for various uses, even with the metals and alloys now available. But metals and alloys with new and improved properties are currently being made available for his use. New processes for fabricating metals are being developed and old ones are being improved. Any such new material or process may disturb the economic balance. A change from a machined part to a die casting probably not only results in a reduction in the machine tool requirements and change of machine type, but also in a change of material from, say, iron, steel, or brass to an aluminum or zinc alloy.

The engineer's already difficult tasks are made even more difficult by a constant change in the state of the metal art. The progressive engineer should not only have a thorough understanding of services to which metals are to be put, but he should have also a general understanding of the principal properties of the metals and alloys.

FOR ENAMELING METAL

Process Patented, Gives Definite Oxide Condition to Promote Adherence of Enamel

United States patent No. 1,578,706 was issued March 30 to Wesley J. Beck and James A. Aupperle, Middletown, Ohio, for a process for enameling metal. This has been assigned to the American Rolling Mill Co., Middletown. The object of the invention was to overcome in the enameling process the formation of spots or uneven places beneath the enamel, caused by the gaseous constituent of the metal. Uniformity of steel was regarded as essential to avoid having seconds in any portion of a heat.

One prime object of the investigators was to obtain an iron with a definite and uniform oxide constituent. This oxide is believed to unite with the enamel in the baking process, and to promote adherence. This object can be attained only when the free or liberatable gas constituent is so low that bubbles or spots will not develop in the sheet after heat treatment, pickling or baking of enamel.

Use Open-Hearth Process

In practice, the open-hearth steel process is used, but the temperature is kept high and ore is added to the charge until a high degree of refinement has been obtained. This tends to increase temperature toward the end of the melt. It was decided that any highly refined iron, practically without carbon and manganese, which develops a skull in the ladle is not proper material for enameling stock. For this reason the high temperature is required.

It was found that, if the residual manganese were more than 0.04 per cent, the condition of the metal after degasification and deoxidization was not sufficiently uniform for best enameling practice. In fact, the desired manganese content was placed below 0.025 per cent.

Oxide Promotes Fusion

Microscopic examination of the finished sheet, ready for enameling, shows a peculiar condition of oxide of iron which gives the best obtainable fusion with vitreous enamel of any sheet metal used. Within this manganese range the product is so regular, where care is used in selection of scrap and other raw materials, that definite proportions of aluminum can be used, giving a sound ingot practically free from blow holes and having the oxide inclusions as described.

Three claims are covered in the patent, each being for the material which is to receive the coating of vitreous enamel. These cover divergent conditions of the metal as made in accordance with the description just preceding.

COMING MEETINGS

September

New Haven Machine Tool Exhibition. Sept. 7 to 10. Sixth annual meeting, Mason Laboratory, Yale University, New Haven, Conn. H. R. Westcott, 400 Temple Street, New Haven, chairman exhibition committee.

Concrete Reinforcing Steel Institute. Sept. 13 to 15. Semi-annual meeting, French Lick Springs Hotel, French Lick, Ind. M. A. Beeman, 2112 Tribune Tower, Chicago, secretary.

Ohio State Foundrymen's Association. Sept. 16 and 17. Annual meeting, Hotel Sinton, Cincinnati.

American Society for Steel Treating. Sept. 20 to 24, inclusive. Eighth annual convention and national steel and machine tool exposition, Municipal Pier, Chicago. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, secretary.

Society of Automotive Engineers. Sept. 21 to 23. Annual production meeting, Hotel Sherman, Chicago. John Warner, 29 West Thirty-ninth Street, New York, manager meeting arrangements.

American Foundrymen's Association. Sept. 27 to Oct. 1. Thirtieth annual convention and second international foundrymen's congress, Book-Cadillac Hotel, Detroit. C. E. Hoyt, 140 South Dearborn Street, Chicago, secretary-treasurer.

October

American Institute of Mining and Metallurgical Engineers. Oct. 5 to 9. One hundred thirty-fourth general meeting, Hotel Schenley, Pittsburgh. H. Foster Bain, 29 West Thirty-ninth Street, New York, secretary.

National Association of Manufacturers. Oct. 5, 6 and 7. Thirty-second annual meeting, Waldorf-Astoria Hotel, New York. George S. Boudinot, 50 Church Street, New York, secretary.

American Electrochemical Society. Oct. 7, 8 and 9. Fall meeting, Hotel Washington, Washington. Colin G. Fink, Columbia University, New York, secretary.

American Management Association. Oct. 11 and 12. Fall meeting, Hotel Statler, Cleveland. W. J. Donald, 20 Vesey Street, New York, managing director.

American Gear Manufacturers' Association. Oct. 14, 15 and 16. Semi-annual meeting, Briarcliff Lodge, Briarcliff Manor, N. Y. T. W. Owen, 2443 Prospect Avenue, Cleveland, secretary.

American Iron and Steel Institute. Oct. 22. Fall meeting, Hotel Commodore, New York. E. A. S. Clarke, 40 Rector Street, New York, secretary.

National Safety Council. Oct. 25 to 30. Fifteenth annual safety congress, Hotel Statler, Detroit. W. H. Cameron, 168 North Michigan Avenue, Chicago, managing director.

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Prompt and Dependable Statistics

PRODUCTION of pig iron and ferroalloys in the United States in the first half of this year is reported by the American Iron and Steel Institute at 20,016,082 tons, or 4.5 per cent increase over the first half of last year. Production of charcoal iron continued its downward trend, amounting to only 77,361 tons in the half year, less than one-half of 1 per cent of the total, against 99,132 tons in the first half of 1925 and 99,032 tons in the second half. The monthly statistics of THE IRON AGE do not include charcoal iron and the omission is thus seen to be inconsequential.

For the first time these semi-annual statistics are compiled in accordance with this definition of pig iron, which was adopted by the institute at the beginning of this year:

> A metallic product, the result of blast furnace or electric smelting of iron ores, which is used as part or all of the initial metallic charge in steel making, puddling and producing molten metal for foundry use.

The monthly statistics of THE IRON AGE do not include charcoal pig iron. Nor do they include ferroalloys produced in the electric furnace, since from the beginning our figures have represented only blast furnace products. Comparing the American Iron and Steel Institute figures, so far as they relate to blast furnace products, with those of THE IRON AGE, and eliminating charcoal pig iron, we find that our total for the first half of 1926—19,848,461 gross tons—is within 3175 tons of the official figures for the coke pig iron and ferroalloy output for the first half of this year. Here is a difference of less than 1/60 of 1 per cent, and yet our figures, largely gathered by wire, often reach the public within a day or two of the month's close.

The pig iron and ferroalloy production for the first half of 1926, at 20,016,082 tons, has been exceeded in two six-month periods. In the second half of 1918, with the war effort at its peak, up to the Armistice, the country produced 20,826,914 tons, and in the first half of 1923 (when, as appeared later, there was over-production of steel) the total was 21,016,475 tons.

Income of Labor and Capital

IN the voluminous report of the Federal Trade Commission on national wealth and income, referred to in THE IRON AGE of Sept. 2, page 603, are some interesting presentations of the division of income between labor and capital. Questions are often asked as to this division without a definite assumption as to how the compilation should be made, for there are several intricate points. One awkward feature is that often it is purely an incident whether a man performs labor for himself or for some one else, yet the statistics must classify the cases differently.

The man in the street wants to know in a general way how much of the money is going to the owner or boss, and how much to the man who "does the work." In the trade commission report over 90 per cent of the agricultural income in 1918 and 1919 and between 80 and 90 per cent in each of the four subsequent years is assigned to "capital," but the man in the street would be willing to concede that the farmer is a worker.

This is the most striking inclusion in the "capitalistic" class of those who work quite the same as others who statistically are "wage earners." However, the figures are interesting in themselves, and are of particular interest for comparison of results in different years. For the total national income the respective percentages for the six years covered by the report are as follows:

Percentage Division of Income

	Labor	Capital
1918	46.8	53.2
1919	48.5	51.5
1920	57.8	42.2
1921	59.9	40.1
1922	54.6	45.4
1923	54.7	45.3

The most valuable point in these figures is the comparison between years. It has often been

pointed out, and it cannot too often be pointed for the general welfare and peace of mind, that as things actually go an unusually high percentage division to labor is associated with adversity rather than with prosperity. The year 1921 with the largest labor percentage is the year of lowest total income. It is true that 1918 and 1919 show a low labor percentage while total income was high, but adjustment occurred in time. The labor percentage was lower in 1922 and 1923 than in either 1920 or 1921, but the total income adjusted for purchasing power was larger.

On account of the wide variations in character of work involved in these totals, the separate figures for "mining, manufacture and construction" are more illuminating. These percentage figures are as follows:

	Wages and Salaries	Rents, Royalties, Interest and Profits
1918	59.5	40.5
1919	59.6	40.4
1920	64.8	35.2
1921	76.6	23.4
1922	67.2	32.8
1923	65.3	34.7

Following the readjustment the course of these figures is clear—increasing prosperity after 1921 and decreasing percentages in the first column, but representing increasing income, for the wage and salary totals represented by the percentages were: 1921, $13,587,000,000; 1922, $15,654,000,000; 1923, $19,194,000,000.

A New Quantity Differential?

AS a move toward price stability in finished steel —bars, for example—the card of extras issued by makers might add to the quantity differentials an item covering lots of less than 100 tons. The general understanding is that 10 cents per 100 pounds is the addition to the base price for purchases under 100 tons; but it is not covered by the extras-card, which commonly provides an extra charge only for lots of less than 1 ton. On the buyers' side the complaint is made that some bar mills are not particularly firm in demanding the differential, and the suggestion is made that a black and white proviso in the printed tabulations would remove the question from the region of negotiation and give it a precise and authoritative standing.

The whole effort of the mills to draw a 100-ton line seemed at first simply to aim at strengthening the base price for large lots, but it also represents an attempt to cover the expense of the usual assortment of sizes accompanying the smaller order. The so-called short-range buying has of course multiplied the number of orders which have a warehouse complexion, and to no small extent the steel mill has been serving as an intermediary warehouse. Many sellers report specifications for a variety of sizes and amounts that preclude specific mill scheduling and these come quite largely from jobbers themselves. By asking the extra, the mills consider that they serve the local distributer while at the same time they get a return for the added cost of handling the order.

As to any mills that do not make the charge, it is explained that usually it is in the case of a buyer who averages over 100 tons a month but who cannot be brought into the old habit of covering, say, a quarter's needs, thereby getting the best price and specifying whatever quantities satisfy at the moment.

While there is no early probability of the close buyer paying the suggested quantity differential, the extent to which the proposal has been discussed indicates how many readjustments are involved in this era of "production for consumption" that is now with us.

Efficient Pig Iron Production

A LOW consumption of limestone in making pig iron is concrete evidence of efficiency in pig iron production. Information for the year 1925 is supplied in the annual statistical report of the American Iron and Steel Institute, just issued. The consumption was the lowest ever reported.

From time to time there appear dissertations to the effect that our best iron ores are gone and that ores of the present commercial grade are not plentiful, the deduction being that eventually we shall be hard put to make pig iron at feasible cost because there will be nothing but "low-grade" ore left.

The rejoinder to these unfavorable prophecies is that methods are constantly improving so that increasing skill may be counted upon to make up for exhaustion of the best materials nature originally provided.

The test of limestone consumption per ton of pig iron made is a comprehensive and trustworthy index of what we are doing. The statistical record, which began with the year 1897, is altogether a favorable one. In that year and the next the best and cheapest iron ore the United States has ever had was being supplied from the recently opened Mesabi range. Pig iron prices were very low and only the most favorable materials could be used. In those years limestone consumption per ton of coke and anthracite iron made was 1002.3 and 1020.4 lb. respectively. Later the average ran up to 1200 lb., but with 1911 a decrease set in which has been almost continuous to date. In only one year of the past five has the consumption averaged above 1000 lb., and last year with 932.1 lb. was the lowest in all the record.

To those directly engaged in manufacture it is important to know how this improvement in practice has been effected. Conditions involved include preparation of ore, character of coke, blast furnace lines and operation of blast furnaces. To the industry at large the important point is simply that the thing is being done. With poorer ore pig iron is being made more efficiently. With

Limestone Consumption, Pounds Per Ton of Pig Iron

1897	1,002.3	1912	1,146.1
1898	1,020.4	1913	1,170.5
1899	(no data)	1914	1,119.6
1900	1,222.9	1915	1,116.3
1901	1,202.7	1916	1,049.2
1902	1,207.7	1917	1,036.6
1903	1,207.3	1918	1,041.8
1904	1,128.0	1919	1,099.6
1905	1,144.3	1920	1,092.6
1906	1,192.8	1921	995.5
1907	1,247.8	1922	974.9
1908	1,229.4	1923	1,006.0
1909	1,190.5	1924	944.5
1910	1,204.0	1925	932.1
1911	1,153.6		

such steady progress shown, the inference is that improvements in future will offset the accumulating disadvantages that have been predicted.

There are statistics also of the ferrous materials charged to blast furnaces. In 1925 there was an average of 1.791 tons of ore and 0.137 ton of scrap, scale, cinder, etc., charged per ton of pig iron, a total of 1.928 tons, this being the same as in 1924. The general trend has been slightly downward in recent years, but there is not, as might be supposed, any clearly marked increase in the proportion of scrap to ore.

The full statistics of limestone consumption per ton of coke and anthracite pig iron made are given in the accompanying table. There are figures for all pig iron, including charcoal iron, but they are not so indicative, on account of the decline in charcoal iron manufacture. Except for insignificant tonnages in 1921 and 1923 no anthracite iron has been made in the past five years.

CORRESPONDENCE

First Electric Traveling Crane Built in the United States

To the Editor—In the Aug. 26 issue of THE IRON AGE I noticed an article under the title "How the Electric Traveling Crane Came," which I found very interesting. However, under the sub-caption "First Electric Traveling Crane" on page 542 there are some statements which are not correct. One of the paragraphs reads:

> "The E. P. Allis Co., Milwaukee, now the Allis-Chalmers Co., had an engineer named Shaw. He visited the Morgan plant and there saw the drawings which had been made for a three-motor crane. Mr. Shaw went home and designed a three-motor crane, which he had built by the Pawling & Harnischfeger Co. That was the first three-motor crane built in America. It was placed in operation in 1890. Later Mr. Shaw organized the Shaw Electric Crane Co. and went into the manufacture of cranes on his own account."

The statements made in this paragraph are erroneous and any one reading it would come to the conclusion that Mr. Shaw appropriated the idea of a three-motor crane from the Morgan Engineering Co. In order to clear the name of Mr. Shaw who is now deceased, I wish to bring the facts of the matter before your readers. I was at that time a member of the firm of Pawling & Harnischfeger and was a party to all transactions that took place in the building of the crane mentioned in your article. This was not the first three-motor crane built in America but the *third*.

The building of the *first* crane came about in this way: The Edward P. Allis Co. (now Allis-Chalmers Mfg. Co.) had purchased two rope-driven cranes built by the Yale & Towne Mfg. Co., one of which collapsed and dropped to the floor; due, however, to no fault of the crane. Mr. Shaw had been working in the employ of Yale & Towne in their overhead crane division and was requested to redesign and repair this crane. He then conceived the idea of attaching three independent motors and dispensing with all clutches and gearing. At that time there were no controllers, rheostats or any appliances that are required for satisfactory operation of crane motors, and Mr. Shaw designed all the electrical parts. This crane was put into operation and it worked so satisfactorily that Mr. Shaw made an application for a three-motor patent, which was granted to him. The first three-motor electric crane, therefore, was not put in operation in 1890, as stated in your article, but in 1888.

Mr. Shaw later tried to interest the Edward P. Allis Co. in building three-motor cranes and an order was taken from the Williams Engine Co. of Beloit, Wis. This crane was built by the saw mill department of the Edward P. Allis Co. and proved to be a success, but the cost was greater than the contract price received. After this experience the Edward P. Allis Co. decided not to interest itself in the building of three-motor overhead traveling cranes and so informed Mr. Shaw, who had assigned all patents to the Allis company.

Mr. Shaw, therefore, looked for other connections, and on Nov. 25, 1889, the Shaw Electric Crane Co. was organized. In this new company were associated with Mr. Shaw, Alonzo Pawling and H. Harnischfeger, of the firm of Pawling & Harnischfeger. The crane referred to in your article was built by the Shaw Electric Crane Co. in the shop of Pawling & Harnischfeger and was a 40-ton double trolley crane built for the Union Pacific Railway and erected in their repair shop at Cheyenne, Wyo., and was the *third* crane built with separate motors for each motion. A picture of this crane may be seen in my office.

When the agreement between Mr. Shaw and Pawling & Harnischfeger expired on Oct. 1, 1892, Mr. Shaw withdrew from the company and moved to Muskegon, Mich., where the present Shaw Electric Crane Co. plant is in operation.

So the first three-motor crane built in America was a rebuilt crane of 10 tons capacity originally made by Yale & Towne. The second was a 10-ton crane built for the Williams Engine Co., and the third was built by the Shaw Electric Co. in the shop of Pawling & Harnischfeger.

I hope that you will give these statements a prominent place in an early issue of THE IRON AGE.

HARNISCHFEGER CORPORATION,
By H. Harnischfeger, President.

Milwaukee, Aug. 30.

Protest Against Rates on Foreign Steel from Gulf Ports

WASHINGTON, Sept. 7—Iron and steel interests of Kansas City have filed a supplemental petition with the Interstate Commerce Commission asking for a review of the recent decision of the commission in the matter of rates on iron and steel imported from Gulf ports to interstate destinations. Civic organizations in Kansas City join with the producers in the contention that the present rates unjustly discriminate against and prejudice iron and steel products moving from Kansas City and other domestic points. A review of the commission's decision was published in THE IRON AGE of Sept. 2, page 634.

Advances in Metallurgy

In the course of an address presented at the twenty-first anniversary celebrations of Sheffield University, Sheffield, England, July 2, Sir Robert A. Hadfield touched on the next big advance in metallurgy or engineering. "We want," he said, "and shall probably get, another Bessemer, Siemens, Whitworth or Sorby. The mantles of these men and their peers may fall on some students now here. Why not? The marshal's baton is in every knapsack waiting to be grasped.

"From the making of arrow heads to the manufacture of 18-in. armor-piercing shell is indeed a far cry, and it is curious to reflect how much of this advance has been achieved during the past forty years or so. Those outside the steel industry can hardly realize the amount of time, thought, labor, and money expended in the unceasing rivalry between armor and projectile, the perfection and introduction of alloy steels, and the development of processes and machinery for these and similar purposes."

STEEL CORPORATION IN CHILE

Galvanizing Plant at Valparaiso Will Add Fabricating and Other Lines

Control of the Compania de Maestranzas y Galvanizacion of Chile was acquired recently by the United States Steel Products Co., the United States Steel Corporation's subsidiary. The Compania de Maestranzas y Galvanizacion is a Chilean corporation and is the successor of the firm of Lever, Murphy & Co., which was founded by American citizens 40 years ago. At that time the Chilean Government granted a concession of a stretch of water front at Caleta Abarca, on Valparaiso Bay, within the limits of the city of Vina del Mar, which adjoins and is in fact a suburb of the city of Valparaiso. In connection with this water front concession, and on land adjoining it acquired for the purpose, Lever, Murphy & Co. and their successors developed a galvanizing and fabricating plant and a shipyard for the building and repairing of barges, lighters and other small craft.

The intention is to reconstruct and equip the plant with the most up-to-date machinery and appliances to manufacture in Chile galvanized sheets equal in quality to the well known Apollo brand of the American Sheet & Tin Plate Co. The plant will be equipped also with facilities for fabricating structural steel work of all kinds, for building, assembling and repairing railroad cars and locomotives, for building and repairing barges, lighters and small steamers, and a general line of fabricating work for buildings, bridges, etc.

It will be possible, also, to manufacture various other finished steel products, including woven wire reinforcement for concrete and wire nails.

The location of the plant on Valparaiso harbor, with its own switch connection to the main line of the Chilean State Railway to Santiago, is convenient for Valparaiso and inland deliveries, with adequate provision both for the reception of the unfinished steel from the United States and for its distribution after finish or fabrication to Chilean ports, as well as into the interior.

Steel Corporation to Make British Patented Coated Steel Pipe

The United States Steel Corporation has acquired from British interests the American patents to a new process for lining steel pipe to render it impervious to moisture and thus make it available for underground water and gas mains.

Details of the new process are not announced. A small plant is to be erected for the manufacture of the coated pipe. The corporation has also acquired the right to purchase a half interest in the basic world patents on the new pipe lining.

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Although the Steel Corporation has not identified the British process, the information obtained makes it resemble the Talbot process pipe illustrated in THE IRON AGE of April 15. This referred to steel pipe coated by a process patented by Benjamin Talbot, Middlesbrough, England. The article was in part as follows:

"This process provides for a hydrocarbon lining, which is said to be entirely impervious to water and is unattacked by caustic solutions or dilute acids, besides being a non-conductor of electricity and therefore immune from destruction through electrolytic action.

"The method employed to apply the lining is a centrifugal application of molten bitumen or other suitable hydrocarbon specially treated to yield the proper physical properties and loaded with a powdery inert filler. The thickness of the lining material can be varied to suit special requirements, but usually is ¼ in. It is flexible, allowing for distortion of tubes during handling, and adds only slightly to the weight of steel pipe.

"Plates for the pipe used in the Talbot process are rolled with a diamond chequer or some other suitable pattern so as to form an anchorage for the lining material. The hydrocarbon material can be applied to the outside as well as the inside of the pipe when desired."

The South Durham Steel & Iron Co., Ltd., West Hartlepool, England, built a new pipe plant at Stockton-on-Tees, adjacent to its plate rolling mills, capable of a large output of pipe ranging from 18 to 72 in. in diameter, in lengths up to 30 ft. and in thickness up to 2 in. Part of the equipment was installed with the special purpose of providing for the manufacture of pipe under the Talbot process.

Efforts to Increase Italian Iron and Steel Output

Steps are being taken by the Italian Government, in cooperation with its domestic iron and steel industry, to replace with locally produced products as much of the imports of these commodities as possible, according to advices to the Department of Commerce from Commercial Attaché H. C. MacLean, Rome.

To this end the Government has waived, temporarily at least, the restrictions placed upon the amount of iron ore to be extracted from the mines on the Island of Elba, and, in turn, producers have agreed to maintain present prices in spite of the increased cost of coal since the British strike went into effect. This action is said in Italy to have been taken with a view to counteracting the effects of the coal and iron combines which have recently been established among other European countries.

Belgian Pig Iron Production at New High Record

A new Belgian record for monthly production of pig iron was set when 307,000 metric tons was produced in July, as compared with the previous high figures of 300,000 tons in May and 295,000 tons in June, states a report to the Department of Commerce from Acting Commercial Attaché E. V. D. Wight, Brussels.

Output figures for July (the production in June being shown in parentheses) follow: Pig iron, 307,000 tons (295,000); steel ingots, 289,000 tons (291,000); steel castings, 6800 tons (6900); finished steel, 256,000 tons (256,000); and finished iron, 13,900 tons (16,000).

Mills report that they are booked well ahead, markets are firm, and the export demand good.

The Paris negotiations for European steel agreement are reported in Europe to have failed because the percentage of participation offered to Belgium was too small. Difficulties were said to have been encountered in respect of the European tube negotiations, one Belgian and two Polish plants objecting.

Railroad earnings in July, at $116,895,311 for the Class I roads, made the largest total since last October and the largest July total in years. For the first seven months the earnings were $611,853,632, or at the annual rate of 5.06 per cent upon the total "allowed" valuation. This falls far short of the 5.75 per cent return permitted the railroads—if they can earn it.

Small Decline in August Iron Output

Complete Data Show Daily Rate Only 737 Tons Less Than in July—Net Loss of 3 Furnaces in Blast

ACTUAL data for the production of pig iron for August confirm the estimated figures published last week. The final returns show the iron output last month to have been 3,200,479 gross tons or 4289 tons more than the estimate of 3,196,190 tons. August production was at the rate of 103,241 tons per day, a decline of less than one per cent. The July decline from June was 3866 tons per day or 3.6 per cent.

The production of coke pig iron for the 31 days in August was 3,200,479 tons or 103,241 tons per day as compared with 3,223,338 tons or 103,978 tons per day for the 31 days in July. The August output is the smallest for any month this year, but exceeds any August since 1923, when it was 111,274 tons per day. A year ago the August rate was only 87,241 tons per day.

There was a net loss of 3 furnaces during August, 11 having been shut down and 8 blown in. In July the net loss was 4 furnaces.

Capacity Active Sept. 1

On Sept. 1 there were 213 furnaces active as compared with 216 on Aug. 1. The estimated daily capacity of the 213 furnaces was 102,085 tons as contrasted with 103,245 tons per day for the 216 furnaces operating on Aug. 1. Of the 8 furnaces blown in, 2 were Steel Corporation stacks, 2 were independent

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant*	Total
August, 1925	68,530	18,711	87,241
September	70,300	20,573	90,873
October	76,464	21,064	97,528
November	77,262	23,505	100,767
December	81,552	23,301	104,853
January, 1926	83,867	23,107	106,974
February	81,148	23,260	104,408
March	85,841	25,191	111,032
April	89,236	25,768	115,004
May	86,682	25,622	112,304
June	82,186	25,658	107,844
July	79,392	24,586	103,978
August	78,216	25,025	103,241

*Includes pig iron made for the market by steel companies.

Pig Iron Production by Districts, Gross Tons

	Aug. (31 days)	July (31 days)	June (30 days)	May (31 days)
New York	196,706	206,252	195,699	229,640
New Jersey	.....	.....	.....	.....
Lehigh Valley	80,506	84,223	91,034	92,696
Schuylkill Valley	67,550	66,531	68,190	81,563
Lower Susquehanna and Lebanon Valleys	35,167	35,945	35,094	36,845
Pittsburgh district	668,100	622,772	653,044	712,232
Shenango Valley	108,719	117,504	134,156	139,201
Western Penna.	127,514	127,622	123,924	145,095
Maryland, Virginia and Kentucky	85,171	82,963	85,901	94,691
Wheeling district	108,429	108,110	117,838	133,792
Mahoning Valley	323,305	317,307	313,633	341,801
Central and Northern Ohio	351,852	348,371	323,904	344,553
Southern Ohio	36,071	48,468	49,438	49,137
Illinois and Indiana	644,907	668,564	661,758	664,477
Mich., Minn., Mo., Wis., Colo. and Utah	121,357	127,135	137,753	153,072
Alabama	238,812	246,124	238,491	254,245
Tennessee	6,313	5,447	5,452	8,388
Total	3,200,479	3,223,338	3,235,309	3,481,428

Coke Furnaces in Blast

Furnaces	Total Stacks	Sept. 1 In Blast	Sept. 1 Capacity per Day	Aug. 1 In Blast	Aug. 1 Capacity per Day
New York:					
Buffalo	21	13	5,670	13	5,695
Other New York	5	3	900	2	770
New Jersey	3	0	....	0	....
Pennsylvania:					
Lehigh Valley	12	6	2,310	7	2,600
Spiegeleisen	2	1	130	1	120
Schuylkill Valley	12	5	2,110	5	2,145
Susquehanna Valley	6	2	860	2	875
Ferromanganese	1	0	....	0	....
Lebanon Valley	4	1	210	1	210
Ferromanganese	2	1	60	1	70
Pittsburgh District	52	38	20,500	37	19,970
Ferro. and Spiegel	4	2	250	3	375
Shenango Valley	14	7	3,570	7	3,790
Western Pennsylvania	19	8	3,830	8	3,860
Ferro. and Spiegel.	2	2	280	2	290
Maryland	6	5	2,075	5	2,000
Wheeling District	12	7	3,490	7	3,480
Ohio:					
Mahoning Valley	26	19	10,230	19	10,235
Central and Northern	22	19	11,000	20	11,230
Southern	13	6	1,500	6	1,565
Illinois and Indiana	43	31	20,620	32	21,050
Mich., Wis. and Minn.	12	7	2,620	8	3,000
Colo., Mo. and Utah	7	3	1,300	3	1,340
The South:					
Virginia	16	1	240	1	250
Ferromanganese	1	1	75	1	75
Kentucky	5	1	355	1	345
Alabama	34	23	7,700	23	7,730
Ferromanganese	1	0	....	0	....
Tennessee	12	1	200	1	175
Total	369	213	102,085	216	103,245

Production of Steel Companies for Own Use—Gross Tons

	Total Iron, Spiegel and Ferro 1925	Total Iron, Spiegel and Ferro 1926	Spiegeleisen and Ferromanganese* 1925 Fe-Mn	1925 Spiegel	1926 Fe-Mn	1926 Spiegel
Jan.	2,692,537	2,599,876	23,578	5,418	29,129	7,746
Feb.	2,539,785	2,272,150	18,184	4,910	22,309	7,084
Mar.	2,812,995	2,661,092	20,062	5,449	24,064	7,339
Apr.	2,514,828	2,677,094	21,448	5,341	24,134	7,051
May	2,306,887	2,687,138	22,679	5,294	23,159	6,999
June	2,113,566	2,465,583	19,836	4,972	25,378	5,864
½ year	14,980,598	15,362,933	125,787	31,384	148,173	42,083
July	2,037,160	2,461,161	16,614	5,074	26,877	3,699
Aug.	2,124,439	2,424,687	18,867	4,939	23,557	4,372
Sept.	2,109,205	.....	18,381	5,162	....	....
Oct.	2,370,382	.....	21,421	5,071	....	....
Nov.	2,317,888	.....	25,490	6,375	....	....
Dec.	2,528,120	.....	26,072	7,756	....	....
Year	28,467,792	.....	252,632	65,761	....	....

*Includes output of merchant furnaces.

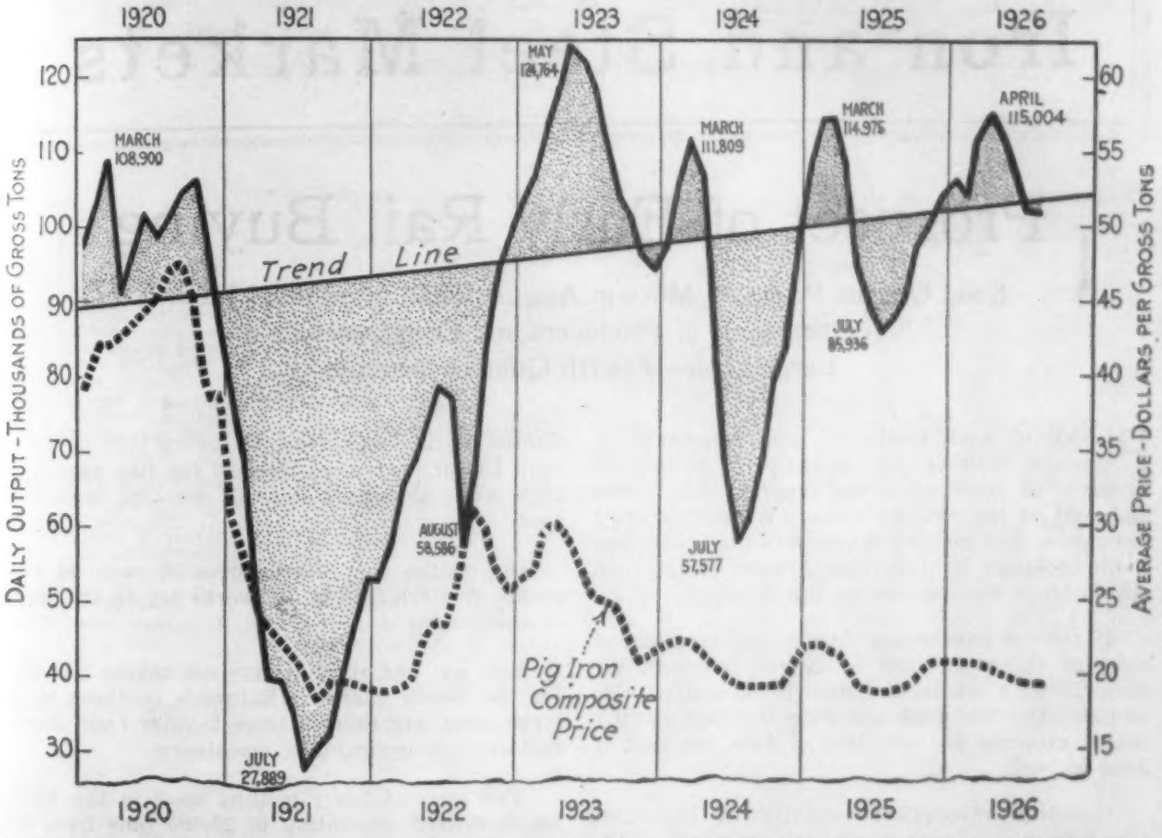
Production of Coke and Anthracite Pig Iron in United States By Months, Beginning Jan. 1, 1924—Gross Tons

	1924	1925	1926
Jan.	3,018,890	3,370,336	3,316,201
Feb.	3,074,757	3,214,143	2,923,415
Mar.	3,466,086	3,564,247	3,441,986
Apr.	3,233,428	3,258,958	3,450,122
May	2,615,110	2,930,807	3,481,428
June	2,026,221	2,673,457	3,235,309
½ year	17,434,492	19,011,948	19,848,461
July	1,784,599	2,664,024	3,223,338
Aug.	1,887,145	2,704,476	3,200,479
Sept.	2,053,264	2,726,198	.....
Oct.	2,477,127	3,023,370	.....
Nov.	2,509,673	3,023,006	.....
Dec.	2,961,702	3,250,448	.....
Year*	31,108,302	36,403,470	.....

*These totals do not include charcoal pig iron. The 1925 production of this iron was 196,164 tons.

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1922—Gross Tons

	1922	1923	1924	1925	1926
Jan.	53,063	104,181	97,384	108,720	106,974
Feb.	58,214	106,935	106,026	114,791	104,408
Mar.	65,675	113,673	111,809	114,975	111,032
Apr.	69,070	118,324	107,781	108,632	115,004
May	74,409	124,764	84,358	94,542	112,304
June	78,701	122,548	67,541	89,115	107,844
½ year	66,578	115,147	95,794	105,039	109,660
July	77,592	118,656	57,577	85,936	103,978
Aug.	58,586	111,274	60,875	87,241	103,241
Sept.	67,791	104,184	68,442	90,873	.....
Oct.	85,092	101,586	79,907	97,528	.....
Nov.	94,990	96,476	83,656	100,767	.....
Dec.	99,577	94,225	95,539	104,853	.....
Year	73,645	109,713	85,075	99,735	.....



Daily Pig Iron Output in August Less Than One Per Cent Lower Than in July; Composite Price Slightly Lower

Inclined line represents the gradually increasing theoretical needs of the country, and shows that production is slightly below the so-called normal. Dotted line represents THE IRON AGE *composite price*

steel company furnaces and 4 were merchant. Of the 11 furnaces which were shut down last month, 4 belonged to the Steel Corporation, 4 to independent steel companies and 3 to merchant.

Manganese Alloy Output

The August production of ferromanganese was 23,557 tons, comparing with 26,877 tons in July. The spiegeleisen output last month was 4372 tons as against 3699 tons in July.

Furnaces Blown In and Out

Among the furnaces blown in during August was the Buffalo B furnace and the Genesee furnace of the M. A. Hanna Co. in New York; one furnace of the New Jersey Zinc Co. in the Lehigh Valley; one Carrie and one Lucy furnace of the Carnegie Steel Co. and one Eliza furnace of the Jones & Laughlin Steel Corporation in the Pittsburgh district; the Dover furnace in the central and northern Ohio district and No. 4 North Birmingham furnace of the Sloss-Sheffield Steel & Iron Co. in Alabama.

Among the furnaces blown out or banked during August was one Donner furnace of the Donner Steel Co. in New York; one furnace at the Bethlehem plant of the Bethlehem Steel Corporation and one furnace of the New Jersey Zinc Co. in the Lehigh Valley; one Carrie, one Isabella furnace of the Carnegie Steel Co., and the Clinton in the Pittsburgh district; one Central furnace of the American Steel & Wire Co., and one furnace at the Columbus works of the American Rolling Mills Co., in central and northern Ohio; one Gary furnace in the Chicago district; one Mayville furnace in Wisconsin, and No. 3 North Birmingham furnace of the Sloss-Sheffield Steel & Iron Co. in Alabama.

Blast Furnace Note

No. 2 blast furnace of the Donner Steel Co., Inc., Buffalo, is now being relined. On its last campaign it produced 1,052,672 tons. The previous relining was in 1920, the furnace blowing in on March 7 of that year.

Much experimental rolling will be necessary before the Youngstown Sheet & Tube Co. gets its new seamless pipe mills at the Campbell works into tonnage production, an operating executive states. This is due, in some measure, to the unusual nature of the process. Much of the equipment, especially that for piercing steel ingots, was manufactured in Germany and brought to this country. The company is experiencing some difficulty in securing skilled workers for this class of operation, and has been obliged to import some men from Germany.

Loadings of revenue freight on Class 1 railroads of the United States totaled 1,088,791 carloads in the week ended Aug. 21. This makes the thirteenth week of over 1,000,000 carloads this year. In fact, if the two holidays of May 30 and July 4 be allowed for, no week since May 9 has been below 1,000,000 carloads. This is the first year of which that could be said. In 1925, which showed a record-breaking annual total, the first 1,000,000-carload week was that of July 18.

The Republic Iron & Steel Co., Youngstown, has placed its lapweld and buttweld pipe mills on a double turn basis, owing to increase in the requirements for steel tubes.

Iron and Steel Markets

Prospect of Early Rail Buying

Steel Output Probably More in August Than in June or July—Fall Operations of Producers and Consumers on a Large Scale—Fourth Quarter Demand

PLANS of both producers and consumers of steel for their fall operations point to the continuance of their activities through this month and next at the rate of today. With some steel companies this means a revision of the belief that their bookings in July and August would turn out to be at the expense of fall business.

If reports concerning August performance of some of the large steel companies represent the industry as a whole, the steel ingot statistics to be published this week will show that last month's output exceeded not only that of July, but that of June as well.

Counting theoretical capacity at 56,000,000 tons a year, June was an 80 per cent month, while in July there was a decrease to 78 per cent. Present estimates of August run from 81 to 84 per cent, with indications of a close approach to the 84 per cent of May.

Though its operations last month averaged somewhat more than 85 per cent, the Steel Corporation's total of unfilled orders as of Aug. 31 is likely to show little change from that at the close of July.

In finished steel products market interest still centers in sheets, both on account of continued active demand and the adjustments caused by the change of base from No. 28 to No. 24 and the new gage differentials. Most producers have adopted the new schedule, though transactions are still reported at prices generally prevailing before Sept 1.

Consumers of plates, sheets and strip steel are showing interest in contracts covering the full fourth quarter, and some automobile builders are considering such purchases of the last two products.

There has been some sounding of the market on fourth quarter bars, but thus far without developing concessions from the 2c. basis.

At Chicago there are evidences that rail inquiries in considerable volume will come out this month. Roads in the middle latitudes are expected to do considerable track laying before the end of the year, and rail mill schedules are likely to improve by October. The Southern Pacific has divided orders for 24,000 tons between the Alabama and Sparrows Point mills.

Comparisons made by large producers of steel in the Chicago district show that in the first eight months of this year sales of rolling mill products were 13 per cent more than in the like period of 1925, while shipments were 12 per cent more this year.

Due to the slow development of railroad programs, Western freight car works are on the verge of a shutdown.

Bolt, nut and rivet makers are taking business for the fourth quarter. Railroads continue to be large users, and there is more inquiry from manufacturers of agricultural machinery.

Two sales of heavy melting steel in the Pittsburgh district amounting to 25,000 tons have advanced the market there 50c. or to $18.50, which is within 50c. of the high point of the year.

Several makers of strip steel have opened their books for fourth quarter at 3.50c., Cleveland or Pittsburgh, for cold rolled. Current prices on hot rolled are also being quoted for last quarter delivery.

There is steady specifying against contracts for large structural shapes and mills continue to operate at a high rate, and fabricating shops are doing well for this time of year. In the Middle West, however, not many have more than 90 days' work ahead.

Pig iron in the Pittsburgh district and northern Ohio is somewhat more active, but there is further sharp competition among Valley, Cleveland, and southern Ohio makers.

Extra demand for blast furnace coke, last week, as a protection against the reduced output over Labor Day resulted in an advance of 15 cents a ton, and a steel company closed for 15,000 tons a month for the last quarter, paying over $3.25, or the highest contract price of the year.

Recovery of the German steel trade continues. Delivery terms have lengthened to about seven weeks. Machine tools, agricultural machinery and automobiles, as well as rolled steel, are in increasing demand. Orders have bulked large from Holland, Scandinavia, South America and Japan.

Due to the change in the base gage of black sheets, THE IRON AGE finished steel composite price has advanced to 2.439c. per lb., from 2.431c., which had prevailed for 11 successive weeks. The pig iron composite is unchanged, standing at $19.46 for the ninth week.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

For Early Delivery

Pig Iron, Per Gross Ton:	Sept. 7, 1926	Aug. 31, 1926	Aug. 10, 1926	Sept. 8, 1925
No. 2 fdy., Philadelphia	$21.76	$21.76	$21.76	$21.26
No. 2, Valley furnace	17.50	17.50	17.50	18.50
No. 2, Southern, Cin'ti	24.19	24.19	24.19	22.55
No. 2, Birmingham	21.00	21.00	21.00	18.50
No. 2 foundry, Chicago*	21.00	21.00	21.00	20.50
Basic, del'd, eastern Pa	20.75	20.75	21.00	20.50
Basic, Valley furnace	17.50	17.50	17.50	18.00
Valley Bessemer, del'd P'gh	19.76	19.76	19.76	20.76
Malleable, Chicago*	21.00	21.00	21.00	20.50
Malleable, Valley	17.50	17.50	17.50	18.50
Gray forge, Pittsburgh	18.76	18.76	18.76	19.76
L. S. charcoal, Chicago	29.04	29.04	29.04	29.04
Ferromanganese, furnace	88.00	88.00	88.00	115.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	34.00	34.00	34.00	35.84
Bess. billets, Pittsburgh	35.00	35.00	35.00	35.00
O.-h. billets, Pittsburgh	35.00	35.00	35.00	35.00
O.-h. sheet bars, P'gh	36.00	36.00	36.00	35.00
Forging billets, base, P'gh	40.00	40.00	40.00	40.00
O.-h. billets, Phila	40.30	40.30	40.30	40.30
Wire rods, Pittsburgh	45.00	45.00	45.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb	1.90	1.90	1.90	1.90
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.22	2.22	2.22	2.12
Iron bars, Chicago	2.00	2.00	2.00	1.90
Steel bars, Pittsburgh	2.00	2.00	2.00	1.90
Steel bars, Chicago	2.10	2.10	2.10	2.10
Steel bars, New York	2.34	2.34	2.34	2.24
Tank plates, Pittsburgh	1.90	1.90	1.90	1.80
Tank plates, Chicago	2.10	2.10	2.10	2.10
Tank plates, New York	2.24	2.24	2.24	2.14
Beams, Pittsburgh	2.00	2.00	2.00	1.90
Beams, Chicago	2.10	2.10	2.10	2.10
Beams, New York	2.34	2.34	2.34	2.24
Steel hoops, Pittsburgh	2.50	2.50	2.50	2.40

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire,	Sept. 7, 1926	Aug. 31, 1926	Aug. 10, 1926	Sept. 8, 1925
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.15	3.10	3.10	3.15
Sheets, black, No. 28, Chicago dist. mill	3.25	3.25	3.25	3.30
Sheets, galv., No. 28, P'gh	4.25	4.25	4.20	4.20
Sheets, galv., No. 28 Chicago dist. mill	4.40	4.40	4.40	4.35
Sheets, blue, 9 & 10, P'gh	2.30	2.30	2.30	2.25
Sheets, blue, 9 & 10, Chicago dist. mill	2.40	2.40	2.40	2.40
Wire nails, Pittsburgh	2.65	2.65	2.65	2.65
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.70
Plain wire, Pittsburgh	2.50	2.50	2.50	2.50
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.55
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.35
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.40	3.40
Tin plate, 100 lb. box, P'gh	$5.50	$5.50	$5.50	$5.50
Old Material, Per Gross Ton:				
Carwheels, Chicago	$15.25	$15.50	$16.00	$18.00
Carwheels, Philadelphia	17.50	17.50	17.50	18.50
Heavy steel scrap, P'gh	18.50	18.00	17.50	19.00
Heavy steel scrap, Phila	17.00	17.00	16.00	17.50
Heavy steel scrap, Ch'go	14.25	14.00	14.00	16.75
No. 1 cast, Pittsburgh	17.00	17.00	16.50	17.50
No. 1 cast, Philadelphia	18.50	18.50	17.50	18.00
No. 1 cast, Ch'go (net ton)	17.00	17.00	17.00	18.00
No. 1 RR. wrot., Phila	18.00	18.50	18.00	17.50
No. 1 RR. wrot. Ch'go (net)	13.50	13.50	13.50	16.25
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.25	$3.15	$2.85	$3.40
Foundry coke, prompt	4.25	4.00	4.00	4.50
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.50	14.50	14.62½	14.87½
Electrolytic copper, refinery	14.12½	14.12½	14.25	14.50
Zinc, St. Louis	7.40	7.42½	7.30	7.72½
Zinc, New York	7.75	7.77½	7.65	8.08⅓
Lead, St. Louis	8.65	8.65	8.75	9.25
Lead, New York	8.90	8.90	9.00	9.40
Tin (Straits), New York	67.25	65.87½	66.00	57.75
Antimony (Asiatic), N. Y.	16.25	16.00	17.00	17.12½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Establish Separate Base for Special Finishes of Black Sheets—Heavy Melting Up

PITTSBURGH, Sept. 7.—Steel demand and production have gained so much momentum that even the holiday was not sufficient to cause an interruption. Business of the past week has held well up to the recent average, and again an ingot production of 85 per cent of capacity is reported. There is the same degree of stability to prices that there is to business, and the primary materials, with the exception of pig iron, show greater strength. Two sales of heavy melting steel, aggregating approximately 25,000 tons, have been made in the past week at an advance of 50c. a ton, putting the market on that grade back to within 50c. a ton of its high point of the year. Extra demands for furnace coke, as a protection against a falling off in production over the holiday, have resulted in an advance of 15c. per ton, and an Ohio steel company has closed for 15,000 tons a month for the last quarter of the year, paying more than $3.25, or the highest contract price of the year. The pig iron market has shown more activity, but business has been closed at prices ruling over the past few weeks.

The new base gage and gage differentials on black and galvanized sheets announced a week ago have since found almost complete adoption by manufacturers. Some adjustment of prices on special finishes has been necessary to satisfy some manufacturers. The changed card embraced those finishes based on black sheets, and as most of the production is in the heavier gages, materially lower prices resulted through the reductions in the heavier gages of black sheets. Accordingly, a separate price has been made on the special finishes of black sheets, which now are quoted at 3.10c., base, for No. 24 gage, as against 3c., base, for ordinary one-pass, box-annealed black sheets. Another change in the schedule calls for a change in the base on automobile body sheets, with No. 20 gage now base instead of No. 22 gage. The new base price is 4.25c., producing a price of 4.40c. for No. 22 gage.

Demand for tin plate has lost some of its recent urgency, but incoming business is still in good volume. Wire products are moving steadily. There is no appreciable letdown in the demand for pipe or in specifications for bars and structural steel, while plate bookings actually have improved with mills in this district because of the good business in large outside-diameter pipe, car repairs and river barges.

Some of the automobile companies are ordering steel fairly freely, but others are buying sparingly, and as yet not much fourth quarter business has been negotiated, except possibly in sheets, in which buyers were stimulated to act by the prospect of higher prices. Shipments for the first week of the month in almost all lines have been well up to the August average, and the impression is gaining ground that plant operations this month will equal those of August.

Pig Iron.—Much of the business in foundry iron that was pending a week ago has since been closed, but it all went at the recent minimum quotation. A Greensburg, Pa., melter bought 4500 tons of foundry iron, paying $19.26, delivered, for No. 2 grade. The iron was sold by a western Pennsylvania Steel Company, with a freight rate of $1.26 a ton to destination, as against $1.76 from the Valley. The delivered price would therefore figure back to $17.50 at Valley furnace. The Westinghouse Electric & Mfg. Co. and the Pittsburgh Valve Foundry & Construction Co. are understood to have closed for 2000 tons and 1500 tons respectively at $17, Valley furnace, or its equivalent, for No. 2 foundry. An Allegheny Valley steel maker has bought 2000 tons of basic iron within the past week at $18.76, delivered, the equivalent of $17 at Valley furnace, but the iron will not come from any of the Valley furnaces. Sales of Bessemer iron have been noted all the way from $18 to $19, Valley furnace, one sale of 200 tons being at the higher price. The market, in spite of its record of the past week, shows a stronger undertone, and it begins to look as though producers at an early date would begin to seek higher prices. Recent prices have shown no profit for even those with the lowest costs, and with merchant production decreasing and coke costs tending higher, to say nothing of a very strong market in scrap, a stronger stand on pig iron appears to be logical. W. P. Snyder & Co. make the average price of Bessemer iron from Valley furnaces in August $18.11 and of basic $17.42, as against $18.679 and $17.50 in July. The August averages take cognizance of a few small sales of Bessemer iron at $19, but also of some sales of basic iron at less than $17.50, which was the open market quotation throughout the month.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$17.50 to $18.00
Bessemer	18.00 to 19.00
Gray forge	17.00 to 17.50
No. 2 foundry	17.50 to 18.00
No. 3 foundry	17.00 to 17.50
Malleable	17.50 to 18.50
Low phosphorus, copper free	27.50

Ferroalloys.—Specifications against contracts are reported good, but new business is strictly in keeping with the fact that important consumers are protected by contracts against their requirements for the remainder of this year and are not yet ready to discuss those for 1927. There is no change in prices, which are given on page 731.

Semi-Finished Steel.—Prices established toward the close of last year are still holding. There are reports from time to time of sales at lower prices, but investigation usually discloses merely the translation of a delivered price into a mill base. Lower prices than quoted at Pittsburgh, Youngstown and Cleveland have been available throughout the year on such a basis of calculation. If a Youngstown producer of sheet bars shipped to Cleveland where the price is $36, the net base would be $36, Youngstown, minus the freight to Cleveland. Youngstown makers shipping to Pittsburgh where the quoted price is $36, would not be able to get a net price of $36. Similarly, wire rods have been shipped from Pittsburgh to Chicago, where the price is $46, base. Subtracting the freight on such a shipment would mean a price at Pittsburgh of $41, instead of $45. It is apparent that what is going on in finished steel products is true also of prices of semi-finished steel. Not much open-market trading is noted in the various forms of the latter, and non-integrated manufacturers have not yet taken an active interest in their fourth quarter requirements. It seems probable that most of the business for that period will be on the same verbal basis as that for the past two quarters. Specifications for this month reflect the good rate of operation of sheet, tin, strip and pipe mills. Prices are given on page 731.

Refractories.—It is likely that higher prices will be asked on fire clay brick, as there is evidence of the familiar practice of covering consumers that usually precedes an advance. This seems to have been done in silica and chrome brick, and the real effect of the recent advance will hardly be felt before Jan. 1. Prices are given on page 731.

Warehouse Business.—Effective Sept. 13, local jobbers will begin quoting black and galvanized sheets using No. 24 gage as base. The new price will be the present price of No. 24-gage sheets subject to new gage differentials. There will be a slight reduction in warehouse prices of blue annealed sheets, because of reductions announced in the gage differentials on heavy black sheets.

Wire Products. — Demand for the ordinary wire products remains steady and is of good aggregate volume, despite the fact that individual orders are small, due to the fact that jobbers and manufacturing consumers are keeping purchases closely in accord with real requirements. There has been no change in prices, except that most makers of cement coated nails have issued a new card of extras, which increase ultimate prices from 10c. to 45c. per 100 lb. On coated common nails with countersunk heads the new differentials compare with the old ones as follows:

Size	New Card	Old Card	Increase
	Per 100 Lb.		
2d	$2.40	$1.95	$0.45
3d	1.90	1.70	0.20
4d	1.55	1.20	0.35
5d	1.35	0.95	0.40
6d	1.15	0.80	0.35
7d	0.90	0.70	0.20
8d and 9d	0.75	0.50	0.25
10d	0.65	0.40	0.25
12d	0.55	0.35	0.20
16d	0.45	0.30	0.15
20d to 60d	0.35	0.25	0.10

Rails and Track Supplies.—The prospect for early business in standard-section rails is regarded as promising, as several railroads, some of them drawing on Pittsburgh for supplies, are said to be figuring on laying a good deal of track between now and Dec. 1. This is a special program for some roads and part of the general program of others. It is expected that

THE IRON AGE Composite Prices

Finished Steel

Sept. 7, 1926, 2.439c. Per Lb.

One week ago	2.431c.
One month ago	2.431c.
One year ago	2.396c.
10-year pre-war average	1.689c.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	April 24;	2.446c.,	Jan. 2

Pig Iron

Sept. 7, 1926, $19.46 Per Gross Ton

One week ago	$19.46
One month ago	19.46
One year ago	19.13
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1926	$21.54,	Jan. 5;	$19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	March 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mills	2.00c. to 2.10c.
F.o.b. Chicago	2.10c.
Del'd Philadelphia	2.32c.
Del'd New York	2.34c.
Del'd Cleveland	2.19c.
F.o.b. Birmingham	2.15c. to 2.25c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	2.00c. to 2.10c.

Rail Steel

F.o.b. mill	1.80c. to 1.90c.
F.o.b. Chicago	2.00c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	3.00c.
Common iron, del'd Philadelphia	2.22c.
Common iron, del'd New York	2.24c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.10c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.09c.
Del'd Philadelphia	2.22c.
Del'd New York	2.24c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mill	2.00c. to 2.10c.
F.o.b. Chicago	2.10c.
F.o.b. Birmingham	2.15c. to 2.25c.
Del'd Cleveland	2.19c.
Del'd Philadelphia	2.32c.
Del'd New York	2.34c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
All gages, narrower than 6 in., P'gh	2.50c.
All gages, 6 in. and wider, P'gh	2.30c.
All gages, 6 in. and narrower, Chicago	2.40c.
All gages, wider than 6 in., Chicago	2.50c.
Cotton ties, f.o.b. Atlantic ports, per bundle of 45 lb.	$1.22
Cotton ties, f.o.b. Gulf ports, per bundle of 45 lb.	1.20

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.50c.
Bars, f.o.b. Chicago	2.50c.
Bars, Cleveland	2.55c.
Shafting, ground, f.o.b. mill	*2.70c. to 3.00c.
Strips, f.o.b. Pittsburgh mills	3.50c. to 3.60c.
Strips, f.o.b. Cleveland mills	3.50c.
Strips, delivered Chicago	3.80c. to 3.90c.
Strips, f.o.b. Worcester mills	3.75c.

*According to size.

Wire Products

(To jobbers in car lots f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.65
Galv'd nails, 1-in. and longer	4.65
Galv'd nails, shorter than 1 in.	4.90
Galvanized staples	3.35
Polished staples	3.10
*Cement coated nails	2.65

*Subject to new card of extras dated Sept. 1, 1926.

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$3.50
Annealed fence wire	3.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	67.00
F.o.b. Chicago district mills	68.00
F.o.b. Duluth	63.00
F.o.b. Birmingham	

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	2.25c. to 2.30c.
Nos. 9 and 10, f.o.b. Ch'go dist. mill	2.40c.
Nos. 9 and 10, del'd Philadelphia	2.62c.

Box Annealed, One Pass Cold Rolled

No. 28, f.o.b. Pittsburgh	3.10c. to 3.15c.
No. 28, f.o.b. Ch'go dist. mill	3.25c.
No. 28, del'd Philadelphia	3.42c. to 3.47c.

Galvanized

No. 28, f.o.b. Pittsburgh	4.25c. to 4.30c.
No. 28, f.o.b. Chicago dist. mill	4.40c.
No. 28, del'd Philadelphia	4.62c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.15c.
No. 28, f.o.b. Chicago dist. mill	3.25c.

Automobile Body Sheets

No. 22, f.o.b. Pittsburgh	4.30c.

Long Ternes

No. 28, 8-lb. coating, f.o.b. mill	4.65c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.50
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.60

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.40	20-lb. coating I.C.	$16.30
8-lb. coating I.C.	11.70	25-lb. coating I.C.	17.90
15-lb. coating I.C.	14.85	30-lb. coating I.C.	19.45
		40-lb. coating I.C.	21.65

Alloy Steel Bars

(F.o.b. Pittsburgh or Chicago)

S. A. E. Series Numbers		Base Per 100 Lb.
2100*	(1¼% Nickel, 0.10% to 0.20% Carbon)	$3.20 to $3.25
2300	(3½% Nickel)	4.40 to 4.50
2500	(5% Nickel)	5.50 to 5.65
3100	(Nickel Chromium)	3.40 to 3.50
3200	(Nickel Chromium)	5.00 to 5.25
3300	(Nickel Chromium)	7.00 to 7.25
3400	(Nickel Chromium)	6.25 to 6.50
5100	(Chromium Steel)	3.40 to 3.50
5200*	(Chromium Steel)	7.00 to 7.50
6100	(Chrom. Vanadium bars)	4.20
6100	(Chrom. Vanad. spring steel)	3.50
9250	(Silicon Manganese spring steel)	3.20 to 3.25
	Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)	4.10 to 4.20
	Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)	4.90
	Chromium Molybdenum bars (0.20—1.10 Chrom., 0.25—0.40 Molyb.)	4.25 to 4.35
	Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)	3.40 to 3.50
	Chromium Molybdenum spring steel (1—1.25 Chrom., 0.30—0.50 Molybdenum)	4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½-in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specifications, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$42.00
Light (from billets), f.o.b. mill	$33.00 to $34.00
Light (from rail steel), f.o.b. mill	31.00 to 32.00
Light (from billets), f.o.b. Ch'go mill	34.00 to 36.00

Track Equipment

(F.o.b. Mill)

	Base Per 100 Lb.
Spikes, ⅜ in. and larger	$2.90 to $3.00
Spikes, ⅜ in. and smaller	2.90 to 3.35
Spikes, boat and barge	3.35
Track bolts, all sizes	3.90 to 4.50
Tie plates, steel	2.35 to 2.85
Angle bars	2.75

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	⅛ to ⅜	+11	+30
¼ to ⅜	51	26½	½	22	2
½	54	42½	¾	28	11
¾	60	48½	1 to 1½	30	12
1 to 3	62	50½			

Lap Weld

2	55	42½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	⅛ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	7
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	28	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	37	1½ in.	+19
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 5
3 in.	46	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3½ to 4½ in.	— 9

Beyond the above discounts, 5 to 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3½ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	46
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	34	3½ and 3½ in.	50
2½ and 2¾ in.	43	4 in.	53
3 in.	46	4½, 5 and 6 in.	48

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.20%, base	56
Carbon, 0.20% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercially exact lengths. Warehouse discounts on small lots are less than the above.

1927 rail orders will be placed early this fall. Light rails are not moving with much snap, and prices are easy. Sales of accessories are light but business will be helped by the development of the rail business now in prospect. Prices are given on page 729.

Tubular Goods.—The month starts with the mills well supplied with business in lap-welded and seamless pipe and with schedules calling for as full engagement of these classes of mills as in August. Possibly the demand for oil and gas well pipe is less urgent, but the decrease in orders has been slight. Moreover, delivery promises still run to as much as four weeks on a number of sizes and are even more deferred on 2-in. tubing for pipe line feeders. There is a good deal of line pipe on makers' books and more in sight. Standard-weight pipe is selling steadily, and some swell in buying is looked for this month on account of the fall activity in heating installations. Boiler tube business is fairly good, and prices are steadier than they were earlier in the year. Discounts are given on page 729.

Cold-Finished Steel Bars and Shafting.—Automobile parts makers are specifying steadily, and other consuming industries are taking out tonnages well up to their quotas. Makers generally, however, had heavier shipments than orders in August, and this means a decrease in their obligations. Consumers seem in no hurry to open negotiations for fourth quarter tonnages, and producers are not actively seeking such business. The ruling price, as for some time, is 2.50c., base, Pittsburgh for ordinary tonnages.

Hot-Rolled Flats.—Demand is for small lots, but orders are frequent. Prices are steady at recent levels.

Cold-Rolled Strips.—The market appears somewhat steadier in the East, but continues favorable to buyers in the Middle West, notably in the Detroit district. Fourth quarter contracting by the automobile builders is expected to develop soon. On small-lot business the market still is quotable at 3.50c. to 3.60c., base, Pittsburgh or Cleveland.

Bolts, Nuts and Rivets.—Bolt and nut makers will probably open their books late this week or early next week for fourth quarter business, and the indications point to a continuance of present prices. Demand for these products is very steady, although individual orders and specifications are small, in keeping with a common policy among consumers to let the makers carry the stocks. There is still some irregularity in large rivet prices, but deviations from quotations usually are on car rivets, in which the business offered is usually of attractive size, while the extras over base for size are large enough to permit shading. Discounts and prices are given on page 731.

Steel and Iron Bars.—Specifications for steel bars are steady, but there is little new business and negotiations on fourth quarter contracts are slow in developing. Buyers seem to be in no hurry to talk about their requirements for the last quarter, and mills, with current business rolling in steadily, are loath to start negotiations. There is not much activity in iron bars. Prices are given on page 729.

Sheets.—The new base gage and gage differentials on black and galvanized sheets have been adopted by almost all manufacturers, and as there have been some good-sized orders at 3c., base (No. 24 gage) for black and 3.85c. base (No. 24 gage) for galvanized, it is evident that the new schedules are not finding much opposition among consumers. Delay on the part of a few producers in adopting the new card was due chiefly to the fact that they make finishes and gages that were reduced rather sharply in price by the new set-up. The new card embraces, besides black and galvanized sheets, those finishes that are based on black sheets, such as full cold-rolled, metallic furniture stock, pickled and enameling sheets. The bulk of the production in these grades is in the gages below the new base gage, and the price reduction in some gages runs as much as $4 to $5 per ton. This matter has been adjusted through the naming of 3.10c., base (No. 24 gage) for special or pickled finishes, subject to the new gage differentials. Another interesting outgrowth of the announcement of the new card is that leading producers of automobile body sheets have established No. 20 gage as base and are quoting that gage at 4.25c., which makes No. 22 gage 4.40c., an advance of $2 per ton. The several changes in prices are now in effect so far as new business is concerned, but the mills as a rule have four or five weeks of business on their books that was taken under the old base gage and gage differentials. This coverage gives consumers time to adjust themselves to the new arrangement. Mill operations are averaging 85 per cent of capacity. Prices are given on page 729.

Tin Plate.—Requirements of tin plate for packers' cans appear to be well satisfied, but the orders mills have on their books for these sizes, together with those for general line tin plate, are sufficient to maintain the recent rate of mill operations.

Structural Steel.—There is still very steady specifying against contracts for large structural shapes, and mills in this district continue to operate at a high rate. The structural shops are doing well for this time of the year, although not many of them have more than 90 days of work in sight. Investors seem to have the ideas about deliveries of fabricated steel that are held by users of plain steel, and the report is that the shop promising the earliest delivery has the best chance on pending business. There is no change in plain material prices.

Plates.—Counting the 15,000 tons of steel required for the repair of the Pennsylvania Railroad cars, the 30,000 tons of steel in the 300 miles of 10-in. pipe for South America and almost 2500 tons in 15 river barges, the outlook for plate mill operations in this district is better. The market is firm at 1.90c., base Pittsburgh.

Coke and Coal.—Extra demands occasioned by the holiday have stiffened the spot market for beehive oven coke. In the past week $3.25 per net ton at ovens has been the minimum on spot furnace coke, and there have been sales at as high as $3.40. Spot foundry coke also has stiffened and now is quotable at from $4.25 to $4.75. There continues to be fairly constant demand for coal for export, and as large coke producers are fairly well obligated over the remainder of the year, the supply situation is rather tight. A termination of the British coal strike would probably result in the resumption of a good many idle coke ovens, but continuance of the strike and of the export demand for coal means that only higher prices for coke will bring in more ovens. The Central Furnace Co., Massillon, Ohio, is reported to have closed for 15,000 tons of furnace coke a month for the last quarter of the year. It is reported to have secured this tonnage at less than $3.50, which was commonly quoted, but at more than $3.25. Export demands, plus increasing domestic buying, do not seem to have materially strengthened coal prices.

Old Material.—Heavy melting steel is at least 50c. per ton higher than a week ago, and $18 is now not only the minimum but is impossible except on the general run of offerings of that grade, and then for small tonnages. One steel mill in the district paid $18.50

(*Concluded on page* 737)

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Tank plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforced steel bars	2.90c.
Black sheets (No. 28 gage), 25 or more bundles	4.00c.
Galvanized sheets (No. 28 gage), 25 or more bundles	5.00c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.55c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Spikes, large	3.30c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Bolts, track	4.90c.
Wire, black soft annealed, base per 100 lb.	$3.00
Wire, galvanied soft, base per 100 lb.	3.00
Common wire nails, per keg	3.00
Cement coated nails	3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F. o. b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rolling, 4-in. and over	$35.00
Rolling, 2-in. and smaller	36.00
Forging, ordinary	40.00
Forging, guaranteed	45.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$36.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$35.00
6 in. x 2 in. and smaller	36.00

Skelp

	Per Lb.
Grooved	1.90c.
Sheared	1.90c.
Universal	1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$45.00
Screw stock	$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

*Chicago mill base is $46. Cleveland mill base, $45.

Prices of Raw Materials

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	9.50c. to 10c.
Iron ore, Swedish, average 66% iron	9.50c.
Manganese ore, washed, 51% manganese, from the Caucasus	40c. to 42c.
Manganese ore, high grade, nominal	35c. to 44c.
Tungsten ore, high grade, per unit, in 60% concentrates	$11.75 to $12.50
	Per Ton
Chrome ore, Indian basic, 48% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.50
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton	
Furnace, f.o.b. Connellsville prompt	$3.25 to	$3.40
Foundry, f.o.b. Connellsville prompt	4.25 to	4.75
Foundry, by-product, Ch'go ovens		9.75
Foundry, by-product, New England, del'd		12.00
Foundry, by-product, Newark or Jersey City, delivered	9.59 to	10.77
Foundry, Birmingham	5.50 to	6.00
Foundry, by-product, St. Louis or Granite City		10.00

Coal

	Per Net Ton	
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to	$1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to	1.75
Mine run gas coal, f.o.b. Pa. mines	1.85 to	2.00
Steam slack, f.o.b. W. Pa. mines	1.10 to	1.20
Gas slack, f.o.b. W. Pa. mines	1.20 to	1.30

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.	$88.00 to $95.00
Foreign, 80%, Atlantic or Gulf port, duty paid	88.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$32.00 to $34.00
Domestic, 16 to 19%	31.00 to 33.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$85.00 to $87.50
75%	145.00 to 150.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	$45 to 46.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*
10% $33.00	12%	$37.00
11% 35.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*
6%	$25.50	10% $31.00
7%	26.50	11% 32.00
8%	27.50	12% 35.00
9%	29.00	

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	$1.05 to $1.20
Ferrochromium, 4% carbon and up, 60 to 70% Cr., per lb. contained Cr. delivered	11.50c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.25 to $4.00
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$17.00 to $18.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid,	$17.00 to $17.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

	Per 1000 f.o.b. Works High Duty	Moderate Duty
Pennsylvania	$40.00 to $43.00	$38.00 to $40.00
Maryland	43.00 to 46.00	38.00 to 40.00
New Jersey	55.00 to 75.00	
Ohio	40.00 to 43.00	38.00 to 40.00
Kentucky	40.00 to 43.00	38.00 to 40.00
Illinois	40.00 to 43.00	35.00 to 38.00
Missouri	40.00 to 43.00	35.00 to 38.00
Ground fire clay, per ton	6.50 to	7.50

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.00 to 9.00

Magnesite Brick

	Per Net Ton
Standard size, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00 to 50.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

(Less-than-Carload Lots)

(F.o.b. Pittsburgh, Cleveland, Birmingham and Chicago)

	Per Cent Off List
Machine bolts, small, rolled threads	60 and 10
Machine bolts, all sizes, cut threads	50, 10 and 10
Carriage bolts, smaller and shorter, rolled threads	60, 10 and 10
Carriage bolts, cut threads, all sizes	50 and 10
Eagle carriage bolts	65 and 10
Lag bolts	60, 10 and 10
Plow bolts, Nos. 2 and 7 heads	50 and 10
(Extra of 20% for other style heads)	
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,	45, 10 and 5
Larger and longer sizes	45, 10 and 5
Bolt ends with hot-pressed nuts	50, 10 and 10
Bolt ends with cold-pressed nuts	45, 10 and 5
Hot-pressed nuts, blank and tapped, square,	4.00c. per lb. off list
Hot-pressed nuts, blank or tapped, hexagons,	4.40c. per lb. off list
C.p.c. and t. square or hex. nuts, blank or tapped	4.10c. per lb. off list
Washers*	5.50c. to 6.25c. per lb. off list

*F.o.b. Chicago and Pittsburgh.

The discount on machine, carriage and lag bolts is 5 per cent more than above for car lots. On hot-pressed and cold-punched nuts the discount is 25c. more per 100 lb. than quoted above for car lots.

Bolts and Nuts

(Quoted with actual freight allowed up to but not exceeding 50c. per 100 lb.)

Per Cent Off List

Semi-finished hexagon nuts:

¼ in. and smaller, U. S. S.	60, 10 and 5
⅝ in. and larger, U. S. S.	75, 10 and 5
Small sizes, S. A. E.	60, 10, 10 and 5
S. A. E., ⅝ in. and larger	75, 10, 10 and 5
Stove bolts in packages	80, 10 and 5 to 80 and 10
Stove bolts in bulk,	80, 10, 5 and 2½ to 80, 10 and 2½
Tire bolts	60 and 5

Semi-Finished Castellated and Slotted Nuts

(Actual freight allowed up to but not exceeding 50c. per 100 lb.)

(To jobbers and consumers in large quantities)

	Per 100 Net S.A.E.	U.S.S.		Per 100 Net S.A.E.	U.S.S.
¼-in.	$0.44	$0.44	⅞-in.	$2.35	$2.40
5/16-in.	0.515	0.515	1-in.	3.60	3.60
⅜-in.	0.62	0.66	1-in.	5.65	5.90
7/16-in.	0.79	0.90	1⅛-in.	8.90	8.90
½-in.	1.01	1.06	1¼-in.	12.00	13.10
9/16-in.	1.30	1.42	1⅜-in.	18.35	18.35
⅝-in.	1.70	1.73	1½-in.	21.00	21.00

Larger sizes.—Prices on application.

Large Rivets

	Base Per 100 Lb.
F.o.b. Pittsburgh	$2.50 to $2.60
F.o.b. Cleveland	2.70
F.o.b. Chicago	$2.60 to 2.75

Small Rivets

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70, 10 and 5 to 70 and 10
F.o.b. Chicago	70, 10 and 5 to 70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb.)

	Per Cent Off List
Milled cap screws	60 and 10
Milled standard set screws, case hardened,	10 and 5
Milled headless set screws, cut thread	50
Upset hex. head cap screws, U. S. S. thread,	60, 10 and 10
Upset hex. cap screws, S.A.E. thread,	50, 10 and 10
Upset set screws	60, 10 and 5
Milled studs	70 and 5

Chicago

Steel Business Shows Gain in First Eight Months—Gary Stack Put Out

CHICAGO, Sept. 7.—The output of steel works pig iron has been further curtailed by the blowing out of a Gary furnace. The slowing down in pig iron output is attributed to reduced rail mill operations, since demand for other forms of steel is well maintained. The Steel Corporation now has in operation eight stacks at Gary, eight at South Chicago and one at Joliet, or 17 in blast out of 27 in the district. Counting all steel works blast furnaces in the Chicago territory, there are now 25 active out of 36. Miscellaneous orders for rails are in fair volume and in excess of makers' anticipations at this time. It is the general belief that there will be little or no further slowing down of rail mills, inasmuch as fresh inquiries for large tonnages are expected to come out within the next 10 days or two weeks.

Comparing the first eight months of this year with the corresponding period of 1925, it is found that sales of all steel mill products have increased 13 per cent, specifications have gained 15 per cent, and shipments have risen approximately 12 per cent. For the past week both new business and specifications in plates, shapes and bars are slightly below shipments. Fourth quarter inquiries and purchases thus far have been in good volume, and the price situation in this territory is steady. Car builders in the West fear a shutdown as a result of the lack of orders.

Pig Iron.—The market is quiet, with spot sales well up to the average of August and a fair amount of inquiry appearing from day to day for fourth quarter delivery. In comparing shipments this year with those of the peak year, 1920, sellers point out that the August shipments this year are going into consumption, whereas in August, 1920, a considerable proportion of the iron received by melters was placed in stock. September shipments are holding up to the average of the preceding month. Northern iron remains steady at $21, base, local furnace.

Quotations on Northern foundry, high phosphorus and malleable iron are f.o.b. local furnace, and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards:

Northern No. 2 foundry, sil. 1.75 to 2.25	$21.00
Northern No. 1 foundry, sil. 2.25 to 2.75	21.50
Malleable, not over 2.25 sil.	21.00
High phosphorus	21.00
Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	29.04
Southern No. 2 (all rail)	27.01
Southern No. 2 (barge and rail)	25.18
Low phos., sil. 1 to 2 per cent, copper free	$29.50 to 30.00
Silvery, sil. 8 per cent	32.29
Bessemer ferrosilicon, 14 to 15 per cent	45.79

Ferroalloys.—There is still no domestic spiegeleisen to be had in this market, and it is reported that no great quantity of the foreign material is available. Quotations at New Orleans are $34 to $34.50 for the 18 to 22 per cent grade. Most sales in this territory are at $34, seaboard, or $41.56, delivered. Specifications for 50 per cent ferrosilicon are in good volume, and the ferromanganese market is quiet.

We quote 80 per cent ferromanganese, $95.56, delivered Chicago; 50 per cent ferrosilicon, $85, delivered; spiegeleisen, 18 to 22 per cent, $41.56, delivered Chicago.

Sheets.—Demand continues to expand, and Chicago mills are engaged to full capacity. Deliveries are gradually extending, as both specifications and new buying are in greater volume than production. Although mills have taken some fourth quarter business, books are not officially open for that period. It is generally understood that all makers will adopt the new base gage and extras for black and galvanized sheets, although formal action has not yet been taken by some of them. In the meantime one producer is basing the new prices on the old No. 28 gage base prices less the differentials shown on the old schedule. Subtracting the old differential of 15c. per 100 lb. from the No. 28 gage black sheet price of 3.25c., Chicago district mill, gives a new No. 24 gage base price of 3.10c. Similarly the No. 28 gage mill price on galvanized sheets is 4.40c. and the old differential is 45c., thus bringing the new No. 24 gage base price to 3.95c.

Chicago delivered prices from mill are 3.30c. for No. 28 black; 2.45c. for No. 10 blue annealed; 4.45c. for No. 28 galvanized. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Plates.—Tank builders in the Chicago district are heavily engaged, and there is still a fair amount of inquiry for oil storage tanks before the trade. Mills look for the placing of 4000 tons of tank material within the next 10 days. The Chicago Great Western has placed 300 automobile and 200 box cars with the Pullman Car & Mfg. Corporation. These will be of a comparatively light construction and will require only 3000 tons, besides the axles.

The mill quotation on plates is 2.10c. per lb., base, Chicago.

Fluorspar.—A few scattered sales of this commodity are reported at $18, f.o.b. mines. Interest at the moment centers around deliveries over the remainder of the year.

Cold-Rolled Strips.—Demand remains steady, and mill operations average about 75 per cent of capacity. Prices in this district, however, lack strength, ranging from 3.50c. to 3.60c., base Cleveland, or 3.80c. to 3.90c., delivered Chicago.

Structural Material.—The Chicago Building Trades Council has issued strike orders to all union mechanics employed in the construction of the Joy Morton Building at Washington and Wells Street. The strike was called because the building is being erected by a Landis Award contractor. The Morton building, a 22-story office structure, is the third project in Chicago to become involved in this controversy. It is now feared that the dispute may affect a large share of the construction work now under way in this city. In fabricated steel both inquiries and awards are light, but shops are booked for an average of about two months. Shipments of plain material from mills are going forward at a steady rate, and the average time for delivery has not changed within the last four or five weeks.

The mill quotation on plain material is 2.10c. per lb. base, Chicago.

Warehouse Business.—Demands upon warehouses in the Chicago district were heavy during August, and there appears to be no let-down during the first week in September. In conformity with the announcement recently made by sheet manufacturers, warehouses placed black and galvanized sheets on a No. 24 gage base, effective Sept. 1. The new prices, f.o.b. Chicago warehouse, are 3.95c. per lb. on No. 24 black sheets and 4.80c. on No. 24 galvanized sheets.

Bars.—Shipments of billet steel bars continue at the rate maintained during the latter part of August. In sales August was a trifle under July, the largest month in new business so far this year. Specifications for the week were slightly in excess of shipments. Mill prices are steady at 2.10c., Chicago, in this immediate territory, but in outlying districts where competition is more severe some difficulty is encountered in maintaining the market at that level. Demand for forging bars is well sustained, and users are pressing for deliveries. Bar iron is very quiet. Demand for rail steel bars continues to grow, and the going price of 2c., Chicago, is gathering strength. Both in specifications and new buying August was approximately 5 per cent ahead of July. Demand from bed manufacturers is light, but there has been a considerable increase in the amount of business received from makers of barn equipment. Orders for rail steel bars for reinforcing work have been heavy, one contract just closed calling for 1300 tons. Farm implement makers are specifying more liberally and are asking for prompt deliveries. Shipments of fence posts in the first week of September were considerably above the average maintained in August. The buying movement in fence posts, now under way, started about two weeks earlier than in past years.

Mill prices per lb. are: Mild steel bars, 2.10c., base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 2c., base, Chicago.

Wire Products.—Mills have opened their books for fourth quarter to the manufacturing trade at unchanged prices. Specifications from manufacturing consumers are in good volume, being fully up to the average maintained during the latter part of August. The American Steel & Wire Co. has announced a new card of extras on coated nails, effective Sept. 1, which will mean advances in the prices on some sizes. The old card of extras, which was prepared at the time that the 100-lb. keg was adopted in place of the count keg, was not entirely consistent with manufacturing costs, it is said. Mills are still confident that fall trade will be in good volume. Mill operations have expanded slightly and now range from 60 to 65 per cent of capacity.

Billets.—There is a fair demand in this market for 4-in. and larger rerolling billets, bookings this week totaling 2000 tons. The market is firm at $35, Chicago district mill.

Rails and Track Supplies.—Mills have booked more than 10,000 tons of standard-section rails in miscellaneous lots. Railroad budgets are believed to be near completion, and fall inquiry for rails is expected to get well under way within the next 10 days or two weeks. New business in track supplies during the week was limited to 2000 tons of steel tie plates.

Standard Bessemer and open-hearth rails, $43; light rails, rolled from billets, $36 to $38 per gross ton, f.o.b. maker's mill.

Standard railroad spikes, 2.90c. per lb. mill; track bolts with square nuts, 3.90c. mill; steel tie plates, 2.35c. mill; angle bars, 2.75c. mill.

Bolts, Nuts and Rivets.—Contracts for the fourth quarter are now being drawn up. Specifications are about equal to those of the previous week, and spot buying is averaging close to that of August. The railroads continue to specify liberally, and there is greater interest in supplies on the part of the agricultural machinery industry. Prices as a rule are steady. Large rivets show the least firmness and are still quotable at $2.60 to $2.75, base per 100 lb., Chicago, with the bulk of sales at close to $2.65.

Reinforcing Bars.—Awards for the week are light, but the long list of active inquiries is regarded as an assurance that a good volume of business will be placed during September. The dispute between union labor and contractors working under the Landis award does not appear to have slowed up concrete work under way, but it is being watched closely by those financing new projects. Shipments from warehouses are in good volume, and stocks are reported slightly below normal. Dealers' specifications to mills are heavy, and indications are that stocks will be increased during the month. A strenuous effort is being made to strengthen the warehouse price on billet steel bars. Quotations now range from 2.40c. to 2.60c., warehouse, depending upon the tonnage involved. New inquiries and awards are shown on page 743.

Cast Iron Pipe.—Prices are showing greater strength, now ranging from $40.50 to $42, Birmingham, for 6-in. and larger sizes, or from $48.70 to $50.20, delivered Chicago. Although no large tonnages have been placed, demand for carload lots has been very active. Inquiry from small municipalities and industrial users of pipe is in good volume, although public utilities appear to have withdrawn from the market. Cuyahoga Falls, Ohio, which inquired for 800 tons of 6, 8 and 12-in. Class B pipe and several weeks ago placed about 200 tons of that inquiry with the National Cast Iron Pipe Co., is reported to have awarded the remainder of the business to the United States Cast Iron Pipe & Foundry Co. Royal Oak, Mich., will open bids Sept. 13 on 262 tons of 8-in. and 175 tons of 6-in. Class B pipe. Detroit, which was to have opened bids Sept. 3 on 2197 tons of 8-in. Class B, 2420 tons of 12-in. Class B and 1898 tons of 8-in. Class C pipe has now set the date for Sept. 10.

We quote per net ton, delivered, Chicago, as follows: Water pipe, 4-in., $52.70 to $54.20; 6-in. and over, $48.70 to $50.20; Class A and gas pipe, $4 extra.

Coke.—Chicago producers continue to ship the maximum possible output of local ovens. Contracts for the remainder of the year are practically all closed, and prices are steady at $9.75, ovens, or $10.25 delivered in the Chicago switching district.

Old Material.—Prices are holding remarkably well in view of the fact that consumers are generally well supplied for their immediate requirements and are not in the market for additional material. Dealers are fairly busy covering old orders, and there is every indication that scrap is being consumed at a rate approximately equal to that at which it is coming out. There were no large consumer transactions of heavy melting steel during the week, but dealers continue to trade in this grade at $14.75 per gross ton, delivered, and as a rule do not hesitate to pay higher prices to the railroads. The Burlington is reported to have received $13.50 per net ton on track last week, the equivalent of $15.62 per gross ton, delivered. Mill inspections are still unusually rigid, although there are fewer rejections since dealers are shipping less of the material which they know is not acceptable. In Milwaukee a user has paid $18.75 per gross ton, delivered, for railroad malleable, and other users in that district are interested in low phosphorus grades. Inquiry for cast iron borings has subsided and prices on that grade have declined 50c. Railroad lists are light.

We quote delivered in consumers' yards, Chicago and vicinity, all freight and transfer charges paid for all items, except relaying rails, including angle bars to match, which are quoted f.o.b. dealers' yards:

	Per Gross Ton	
Heavy melting steel	$14.25 to	$14.75
Frogs, switches and guards, cut apart, and miscellaneous rails	16.00 to	16.50
Shoveling steel	14.00 to	14.50
Hydraulic compressed sheets	12.75 to	13.25
Drop forge flashings	9.50 to	10.00
Forged cast and rolled steel car wheels	17.50 to	18.00
Railroad tires, charging box size	18.25 to	18.75
Railroad leaf springs, cut apart	18.00 to	18.50
Steel couplers and knuckles	17.50 to	18.00
Coil springs	18.50 to	19.00
Low phosphorus punchings	17.00 to	17.50
Axle turnings, foundry grade	14.50 to	15.00
Axle turnings, blast fur. grade	12.50 to	13.00
Relaying rails, 56 to 60 lb.	25.50 to	26.50
Relaying rails, 65 lb. and heavier	26.00 to	31.00
Rerolling rails	17.50 to	18.00
Steel rails, less than 3 ft.	17.50 to	18.00
Iron rails	14.50 to	15.00
Cast iron borings	11.50 to	12.00
Short shoveling turnings	11.50 to	12.00
Machine shop turnings	8.00 to	8.50
Railroad malleable	17.50 to	18.00
Agricultural malleable	15.50 to	16.00
Angle bars, steel	16.25 to	16.75
Cast iron car wheels	15.25 to	15.75
Per Net Ton		
No. 1 machinery cast	17.00 to	17.50
No. 1 railroad cast	16.25 to	16.75
No. 1 agricultural cast	16.25 to	16.75
Stove plate	14.50 to	15.00
Grate bars	14.25 to	14.75
Brake shoes	13.75 to	14.25
Iron angle and splice bars	14.00 to	14.50
Iron arch bars and transoms	20.00 to	20.50
Iron car axles	23.00 to	23.50
Steel car axles	17.50 to	18.00
No. 1 railroad wrought	13.50 to	14.00
No. 2 railroad wrought	12.50 to	13.00
No. 1 busheling	11.50 to	12.00
No. 2 busheling	7.50 to	8.00
Locomotive tires, smooth	17.00 to	17.50
Pipes and flues	15.00 to	15.50

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Mild steel bars	3.00c.
Reinforcing bars, billet steel	2.40c. to 2.60c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Hoops	4.15c.
Bands	3.65c.
No. 24 black sheets	3.95c.
No. 10 blue annealed sheets	3.50c.
No. 24 galvanized sheets	5.25c.
Standard railroad spikes	3.55c.
Track bolts	4.55c.
Structural rivets	3.50c.
Boiler rivets	3.70c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	47½
Coach or lag screws	55 and 5
Hot-pressed nuts, square, tapped or blank	2.25c. off per lb.
Hot-pressed nuts, hexagons, tapped or blank	2.75c. off per lb.
No. 8 black annealed wire, per 100 lb.	$3.30
Common wire nails, base, per keg	3.05
Cement coated nails, base, per keg	3.05

Philadelphia

Structural Steel Work Totals 6000 Tons —Pig Iron Market Quiet—Scrap Easier

PHILADELPHIA, Sept. 7.—A holiday lull has pervaded the iron and steel markets during the last week. The only items of importance are two structural steel awards of 2500 tons and another project requiring 3500 tons on which the general contract has been let. Prices of finished steel and pig iron are steady and unchanged. The scrap market is somewhat easier, following recent buying of large tonnages.

Eastern steel mills enter upon the last four months of the year with fairly good order books, except in plates, and the outlook for the remainder of the year is generally regarded as very satisfactory. The momentum which steel business has received from the active buying of July and August is regarded as sufficient to carry production through the year without marked change.

Pig Iron.—The relative inactivity of the pig iron market is of less concern to producers than is usual under such circumstances, due to the fact that furnaces have good order books, and the expectation is that the normal flow of business for last quarter will be sufficient to take up such free iron as is available. One or two furnaces are booked nearly to the end of the year, while others have sold all they will make up to Nov. 1 or later. Current business is mostly in foundry grades in lots ranging from a carload to a few hundred tons. A sale of 500 tons of basic at $21.39, delivered, is reported. Inquiry is very light, but melters are taking iron without any holding up of shipments.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76c. to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$21.76 to $22.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.26 to 22.76
East. Pa. No. 1X	22.76 to 23.26
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.67 to 28.67
Virginia No. 2X, 2.25 to 2.75 sil.	28.17 to 29.17
Basic delivered eastern Pa.	20.75 to 21.50
Gray forge	21.00 to 22.00
Malleable	22.00 to 22.50
Standard low phos. (f.o.b. furnace)	22.00 to 23.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00

Ferromanganese.—There is no buying beyond occasional carload lots. Quotations on ferromanganese remain unchanged at $88, furnace, in the case of one seller, and another quotes $95, furnace.

Billets.—Efforts are being made by some makers of billets to restore extras which formerly were in effect but which have been more or less disregarded for some time. Such extras apply particularly to billets of special analysis. Prices are unchanged at $35 for rerolling quality and $40 for forging quality, f.o.b. Pittsburgh.

Plates.—Eastern plate mills are now operating at about 50 per cent of capacity, a slightly lower rate than that of a month or two ago. There have been signs of slightly increased interest among buyers in the last week. The price is apparently very firm at 1.90c., Pittsburgh.

Structural Steel.—Aside from two projects of 2500 tons awarded and one of 3500 tons pending, as above noted, there has been no special activity in structural steel in the past week. There is a fair number of small jobs. Most of the mills quote 2c., Pittsburgh, on attractive business and 2.10c. on small lots for early delivery, but some business has been done at about 1.90c., Pittsburgh.

Bars.—Consumers of steel bars are specifying against contracts quite freely and are filling their needs by small-lot purchases if contracts have been fully specified. A small amount of contracting for fourth quarter has been done at 2c., Pittsburgh. Bar iron is 2.22c., Philadelphia.

Sheets.—Recent large buying of sheets has provided most consumers with coverage of their requirements for a month or two, and there has been very little buying since the new extras and base prices on black and galvanized sheets went into effect. Blue annealed sheets appear to be firmer at 2.30c., Pittsburgh.

Warehouse Business.—Local warehouses have changed basing prices on black and galvanized to conform to the new mill classifications and are now quoting No. 24 black at 4.25c. per lb. and No. 24 galvanized at 5.20c. per lb., with the mill extras applying.

Imports.—For the first time in many weeks there were no imports of pig iron at Philadelphia last week. The only imports of steel were 331 tons of beams from Belgium and 9 tons of galvanized steel strips from England.

Old Material.—The edge is off the scrap market in eastern Pennsylvania, at least for the present. The recent large buying has taken several important consumers out of the market, and transactions in the past week have been mostly among dealers and brokers. With no important consumer buying in sight, there is the usual effort of brokers to depress prices so that they may realize larger profits on the orders on their books, but the strong tone of the market at Pittsburgh has rendered this effort only partially successful. The Pennsylvania Railroad list, amounting to about 40,000 tons of miscellaneous grades, brought high prices. There is a division of opinion in the scrap trade itself as to the future course of the market. Some believe that prices are due for renewed strength as soon as present orders have been covered, while others express the view that the top has been reached on this movement.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Tank steel plates, ¾-in. and heavier	2.80c. to 3.00c.
Tank steel plates, ¼-in.	3.00c.
Structural shapes	2.75c. to 2.90c.
Soft steel bars, small shapes and iron bars (except bands)	3.00c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1⅛ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforced steel bars, square, twisted and deformed	3.00c.
Cold-finished steel, rounds and hexagons	4.00c.
Cold-finished steel, squares and flats	4.50c.
Steel hoops	4.00c. to 4.25c.
Steel bands, No. 12 gage to ¼-in., inclusive	3.75c. to 3.90c.
Spring steel	5.00c.
No. 24 black sheets	4.25c.
No. 10 blue annealed sheets	3.40c.
No. 24 galvanized sheets	5.20c.
Diamond pattern floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Tool steel	8.50c.
Swedish iron bars	6.00c. to 6.50c.

We quote for delivery, consuming points in this district, as follows:

No. 1 heavy melting steel	$17.00 to $17.50
Scrap rails	17.00 to 17.50
Steel rails for rolling	17.50 to 18.00
No. 1 low phos., heavy, 0.04 per cent and under	21.00 to 22.00
Couplers and knuckles	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
Cast iron carwheels	17.50 to 18.00
No. 1 railroad wrought	18.00 to 18.50
No. 1 forge fire	14.50 to 15.00
Bundled sheets (for steel works)	14.00
Mixed borings and turnings (for blast furnace)	13.00 to 13.50
Machine shop turnings (for steel works)	14.00
Machine shop turnings (for rolling mills)	14.50 to 15.00
Heavy axle turnings (or equivalent)	15.50 to 16.00
Cast borings (for steel works and rolling mill)	14.00 to 14.50
Cast borings (for chemical plant)	16.50 to 17.50
No. 1 cast	18.50 to 19.00
Heavy breakable cast (for steel works)	17.00 to 17.50
Railroad grate bars	14.50 to 15.00
Stove plate (for steel works)	14.50 to 15.00
Wrought iron and soft steel pipes and tubes (new specifications)	16.00 to 16.50
Shafting	22.00 to 23.00
Steel axles	25.00 to 26.00

New York

More Inquiries for Barge Iron—Steel Demand Sustained

NEW YORK, Sept. 7—While nothing resembling a fourth quarter buying movement in pig iron has developed, several important melters are hastening to place orders for barge shipments so that deliveries may be made before the close of navigation. Among consumers who are now in the market are a New York State buyer who wants 1000 tons of foundry iron, and a Connecticut melter who is asking for 2000 to 3000 tons. Other pending inquiries are confined mainly to small lots, although several additional large tonnages are expected to be placed before the trade shortly, among them one 3000-ton lot and three others totaling about 4000 tons. Sales by local brokers during the past week totaled about 6000 tons. The General Electric Co., Schenectady, N. Y., placed 1000 tons for its Elmira, N. Y., plant with a New York State furnace. Most recent transactions, however, were comparatively small. Prices are substantially unchanged, although a trifle firmer. Some of the domestic furnaces have succeeded in accumulating fairly satisfactory bookings. A New York State stack is committed through September and part of October. Although foreign iron has been a factor of diminishing importance in this market, a leading importer of Indian iron has disposed of all of the tonnage purchased for American delivery this year. This material has been selling at $21, base, duty paid port of entry, or slightly higher than recent prices reported on German iron.

We quote per gross ton delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.54 from Virginia:

East Pa. No. 2 fdy., sil. 1.75 to 2.25	$21.89 to $23.02
East Pa. No. 2X fdy., sil. 2.25 to 2.75	22.39 to 23.52
East Pa. No. 1X fdy., sil. 2.75 to 3.25	22.89 to 24.02
Buffalo fdy., sil. 1.75 to 2.25 (all rail)	22.91 to 23.91
No. 2 plain fdy., sil. 1.75 to 2.25 (by barge, del'd alongside in lighterage limits, N. Y. and Brooklyn)	20.00 to 21.00
No. 2 Virginia fdy., sil. 1.75 to 2.25	27.54 to 28.04

Ferroalloys.—New business in ferromanganese is confined to several inquiries for carload and small lots for fairly early delivery. Prices remain unchanged at $88, $90 and $100, seaboard or furnace. Specifications on contract are reported as very heavy. There is very little new business in spiegeleisen which is none too plentiful and prices are unchanged. Some British alloy is coming in and is in a little better demand because of the scarcity of the domestic product.

Warehouse Business.—Most jobbers in this district found August comparable with July in total volume of business. Sales of structural material and reinforcing bars continue good. Following the mill action in changing the sheet differentials and the base gage from No. 28 to No. 24, warehouses are now quoting 4.35c. per lb., base, on black sheets, and 5.10c. per lb. base on galvanized. Some of the larger jobbers handling the heavy gages of galvanized are quoting Nos. 10, 12, 14 and 16 gage on a basis of 5.35c. per lb., adhering, however, to the 5.10c. per lb. base on No. 18 gage and lighter.

Finished Material.—The taking of steel is broad in scope and so far as the holiday interval allows for a gaging is fully up to, if not actually larger than, that of the last days of August. The movement is chiefly that of specifications against material contracted for, say, in June, when there was the nearest approach in months to anything like forward commitments as differentiated from the short-range buying. Fresh buying of steel in general is again for definite early needs, and thus, for example, the new basis of black and galvanized sheet sales will not figure until later this month to cover requirements of the last months of the year. It is stated that 80 per cent of the country's manufacturing capacity in these sheets has adopted the new card making No. 24 gage the base, and a few sales are reported against the schedule. Tin plate and sheets continue notably active with demand good also for export, due largely to the curtailed production of Great Britain. The fabricated steel outlook continues very promising, particularly in apartment construction.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.34c. per lb.; plates, 2.24c.; structural shapes, 2.34c.; bar iron, 2.24c.

Reinforcing Bars.—Small jobs continue to predominate, and no important inquiries have come out in the last week. The McClintic-Marshall Co. will furnish 700 tons of bars for the Mid-Hudson River Bridge near Poughkeepsie, N. Y. Despite rumors of recent shading

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	2.34c.
Soft steel bars and small shapes	2.24c.
Iron bars	2.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished steel shafting and screw stock—	
Rounds and hexagons	4.00c.
Flats and squares	4.50c.
Cold-rolled strip, soft and quarter hard	6.25c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage)	3.89c.
Long terne sheets (No. 28 gage)	6.35c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	2.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread	40 and 10
Carriage bolts, cut thread	30 and 10
Coach screws	40 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in.	$17.28
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
⅛-in. butt	46	29
¼-in. butt	51	37
⅜-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
⅛-in. butt	4	+19
¼-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	6	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass†

	Per Lb.
Nos. 18 to 20	4.15c.
No. 22	4.30c.
No. 24	4.35c.
No. 26	4.45c.
No. 28*	4.60c.
No. 30	4.65c.

Sheets, Galvanized†

	Per Lb.
No. 14	4.50c.
No. 16	4.60c.
No. 18	4.75c.
No. 20	4.90c.
No. 22	4.95c.
No. 24	5.10c.
No. 26	5.35c.
No. 28*	5.60c.
No. 30	6.00c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

†Lots of 50 bundles, 25c. per 100 lb. less.

on larger jobs, mill prices apparently are holding steadily at 2c., base Pittsburgh, and at 2.10c. for smaller tonnages. Youngstown warehouses continue to quote 2.50c. or 2.87½c., delivered New York, while the New York warehouse price remains firm at 3.15c., delivered at job.

Cast Iron Pipe.—Private demand for small lots of water and gas pipe continues active, but municipal inquiries are still scarce. Syracuse, N. Y., opened bids today on 5000 to 6000 tons of 36-in. water pipe. No decision has been reached on the award of 10,000 tons of pipe and fittings by the city of New York, the low bid on which was from E. D. Giberson & Co., New York, representing the Gelsenkirchen Bergwerks, Düsseldorf, Germany.

We quote pressure pipe per net ton, f.o.b. New York in carload lots, as follows: 6-in. and larger, $50.60 to $52.60; 4-in. and 5-in., $55.60 to $57.60; 3-in., $65.60 to $67.60; with $5 additional for Class A and gas pipe.

Coke.—Buying of both standard foundry and furnace grades is reported increasing, particularly the demand for furnace coke, which is bringing up to $3.75 and $4 per ton, Connellsville, for prompt shipment. Active purchasing in the open market by a large steel company is attributed as a cause for the upward movement of furnace grade. There is also a large export inquiry reported current. Connellsville foundry is quoted at $7.91 to $8.91, delivered Newark and Jersey City, N. J.; $8.03 to $9.03, northern New Jersey, and $8.79 to $9.79, New York or Brooklyn. By-product foundry ranges from $9.59 to $10.77, delivered Newark or Jersey City.

Old Material.—Buying prices on all grades are softer, but tonnages are not being offered by holders as freely as might be expected. No. 1 heavy melting steel is still being purchased at $15.50 to $17 per ton, delivered eastern Pennsylvania. It is believed by brokers that the prices of $18.32 per gross ton, Coatesville, Pa., and $17.77 per ton, Claymont, said to have been brought by the recent Pennsylvania Railroad tonnage were the result of an error, since the bidder submitted a gross ton price, while the offering was in net tons. Machine shop turnings, borings and turnings and stove plate have declined to a level affording the buyer the usual profit. Specification pipe is off 50c. per ton to $16, delivered, Lebanon, Pa. Borings and turnings are quoted at $14 per ton, delivered Swedeland, and $13, delivered Bethlehem. Machine shop turnings generally bring $14 per ton and stove plate for steel mills, $14.50 per ton, delivered.

Buying prices per gross ton, New York, follow:

Heavy melting steel (yard)	$11.00 to $11.50
Heavy melting steel (railroad or equivalent)	12.85 to 13.50
Rails for rolling	14.00 to 14.25
Steel car axles	20.75 to 21.25
Iron car axles	24.50 to 25.25
No. 1 railroad wrought	14.75 to 15.25
Forge fire	10.50 to 11.00
No. 1 yard wrought, long	13.75 to 14.25
Cast borings (steel mill)	10.50 to 11.00
Cast borings (chemical)	13.50 to 14.00
Machine shop turnings	10.00 to 10.50
Mixed borings and turnings	10.00 to 10.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	12.25
Stove plate (steel mill)	10.50 to 11.00
Stove plate (foundry)	11.50 to 12.00
Locomotive grate bars	11.00 to 11.50
Malleable cast (railroad)	16.00 to 16.50
Cast iron car wheels	13.50 to 14.00
No. 1 heavy breakable cast	13.00 to 14.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$16.50 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	14.00 to 14.50

Owing to increase in its size within recent years, the Youngstown Sheet & Tube Co. has been obliged to enlarge the circulation of its employees' bulletin from 9000 to 15,000 copies per month. The paper is now produced in the company's own printing department, and its publication is largely in the hands of workers. Company executives believe it has been a potent factor in creating a better spirit among the employees and in disseminating problems of management in a way that could not be done otherwise.

Cleveland

Bar Price Holds on Fourth Quarter Inquiries—Record Ore Movement

CLEVELAND, Sept. 7.—Some steel bar consumers have sounded the market on fourth quarter contracts in the hope of being able to take on tonnage at the 1.90c. price at which they are now getting bars but, meeting with a refusal of a price below 2c., seem to have decided to hold off. However, others have closed contracts at 2c., Pittsburgh, although so far the tonnage placed has not been large. Mills have also taken some plate business for the fourth quarter at the current price of 1.90c., Pittsburgh. Some of the mills have opened their books for the last quarter in hot-rolled strip steel at present prices and for cold-rolled strip at 3.50c., Cleveland.

Consumers of plates, sheets and strip steel are taking more interest in placing contracts for a full quarter than they did earlier in the year, but it is too early to determine to what extent a buying movement will develop this month. Automobile builders have not made commitments very far ahead, but some of them are considering the closing of contracts for the quarter.

Orders so far this month have been in good volume, and as consuming interests are keeping up recent operations, the demand during September is expected to hold up as well as last month. While some of the plate, strip and sheet mills report that they are unable to accumulate much of a backlog, they continue to get enough business to maintain their recent production schedules.

Pig Iron.—Sales and inquiries gained somewhat the past week, during which Cleveland interests sold about 20,000 tons in foundry and malleable iron for prompt shipment and the fourth quarter. Some inquiry has come out for first quarter, but producers are not showing a willingness to quote for that delivery. One interest has inquiries for 7000 tons for this year's delivery. Some price concessions have appeared in this market, which evidently have resulted from the competition of pig iron from the Valley district at $17.50, furnace. The Westinghouse Electric & Mfg. Co., which inquired for 2000 tons for its Cleveland plant, divided its business between the two local producers and bought considerably more iron than its original inquiry called for. Valley producers quoted $17.50, furnace, or $19.26, delivered, on this inquiry, and this necessitated a price of $18.75 by Cleveland makers to get the business on an equal basis, or a shading of 25c. a ton from their regular prices for Cleveland delivery. For out-of-town shipment some Cleveland iron was sold during the week at $17.75, furnace, or a 25c. a ton concession from the common asking price, and a similar concession was made by shading the differentials. An Erie, Pa., melter during the week purchased 1200 tons of foundry iron, and inquiries for 1000-ton lots are pending from Kokomo, Ind., and Springfield, Ohio.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6.01 from Birmingham:

Basic, Valley furnace	$17.50
N'th'n No. 2 fdy., sil. 1.75 to 2.25	19.50
Southern fdy., sil. 1.75 to 2.25	27.01
Malleable	19.50
Ohio silvery, 8 per cent	30.52
Standard low phos., Valley furnace	27.50

Bolts, Nuts and Rivets.—Manufacturers expect that present bolt and nut prices will be reaffirmed for the fourth quarter. The demand continues very satisfactory. The 5 per cent advance on stove bolts announced by some manufacturers in other districts has not yet been generally placed in effect by Cleveland makers. Small rivets are somewhat firmer but can still be bought at 70, 10 and 5 per cent off list. There is some irregularity in semi-finished nuts with sales reported at an additional 10 per cent discount from regular prices. Some of the manufacturers have opened their books for semi-finished nuts, cap and set screws and castellated and slot nuts for the fourth quarter at present prices.

Alloy Steel.—The demand, which has been somewhat slow, shows an increase, with some business being placed for the fourth quarter. While some price irregularities are cropping out, the market shows a somewhat firmer tone than a few weeks ago.

Iron Ore.—A new record in water shipments of Lake Superior ore was made in August, when the Lake fleet moved 10,709,942 tons. This is a gain of 50,739 tons over the previous high record of 10,659,203 tons made in July, 1918. The August movement compares with 9,999,137 tons shipped in July and is a gain of 2,177,224 tons over August shipments last year. The last month in which the 10,000,000-ton mark was reached was in August, 1923. Many of the ore carriers were able to make quick round trips last month because, owing to a scarcity of coal cargoes, they went up the lakes light. The ore movement for the season until Sept. 1 was 35,609,834 tons, as compared with 35,457,153 tons up to Sept. 1 last year. Ore boats got a late start this year owing to delay in the opening of the season of navigation, and consequently shippers were behind on schedules in the earlier part of the season. The movement up to Aug. 1 was more than 2,000,000 tons behind the same period last year. Now that they have caught up with last year, some of the shippers predict that the movement for the season will reach 58,000,000 tons, as compared with 54,098,492 tons moved by water last year. Stocks are lower than for several years. Ore on docks and furnace yards Aug. 1 was 3,641,031 tons less than on the same date a year ago.

Semi-Finished Steel.—A local producer has opened books for fourth quarter contracts at the present prices of $36, Cleveland or Youngstown, for sheet bars and $35 for slabs and large billets, and has booked some contracts for that delivery. Specifications are fairly heavy.

Sheets.—Most mills are now quoting sheets on the new base and gage differentials, and one leading Ohio mill that had expressed some dissatisfaction with the new base this week joined other mills in adopting it. There is uncertainty among producers as to whether the new gage differentials are to apply to special-finish sheets. Furniture stock at present is being quoted both on the new and old gage differentials, but the old base is being maintained for electrical sheets. The volume of business continues good, and some fourth quarter contracts are being taken on the new base. The market shows a firmer tendency. On galvanized sheets 4.30c. for No. 28 gage is now the more common price, and quotations below 4.25c. seem to have disappeared. Most mills are now holding to 2.30c. for blue annealed sheets, and on black sheets there is still a range of from 3.10c to 3.15c. for No. 28 gage.

Strip Steel.—Several makers have opened their books for the fourth quarter at 3.50c., Cleveland or Pittsburgh, for cold-rolled strip, and a price of 3.60c. for this material has virtually disappeared. They are also quoting current prices for hot-rolled strip for the last quarter. Some fourth quarter contracts have been closed both on cold-rolled and hot-rolled strip.

Reinforcing Bars.—Small orders are plentiful, but there is not much inquiry for round lots. New billet bars are fairly firm at 2c., Pittsburgh. Rail steel bars are somewhat irregular, with 1.80c., mill, the ruling quotation, but 1.75c. can be done on a round lot.

Warehouse Business.—Jobbers have not yet placed in effect the new base and gage extras on sheets, but will do so in a few days. Warehouse business in practically all products is heavy. Sales by one local warehouse in August were the largest in three years, indicating that some consumers are depending to a greater extent on jobbers rather than carrying material in stock.

Old Material.—There is some activity among dealers in heavy melting steel for delivery to a Cleveland mill, for which they are paying $15.75. One local consumer has held up shipments on blast furnace scrap. Consequently borings and turnings are not firm locally, although prices on these grades are untested. There is a good demand for scrap for Youngstown shipment against recently placed mill orders. Dealers are paying $17 to $17.50 for heavy melting steel and $16.50 to $16.75 for compressed sheet steel for Youngstown delivery. Scrap offered by Detroit automobile companies the past week is understood to have brought very good prices.

We quote per gross ton delivered consumers' yards in Cleveland:

Heavy melting steel	$15.50 to $15.75
Rails for rolling	16.25 to 16.50
Rails under 3 ft	18.00 to 18.50
Low phosphorus billet, bloom and slab crops	19.00 to 19.50
Low phosphorus sheet bar crops	18.50 to 19.00
Low phosphorus plate scrap	18.50 to 19.00
Low phosphorus forging crops	16.75 to 17.25
Cast iron borings	13.00 to 13.50
Machine shop turnings	11.25 to 11.75
Mixed borings and short turnings	12.00 to 12.50
Compressed sheet steel	14.00 to 14.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	15.50 to 15.75
Railroad malleable	18.00 to 18.50
Light bundled sheet stampings	12.00 to 12.50
Steel axle turnings	13.50 to 13.00
No. 1 cast	16.50 to 17.00
No. 1 busheling	12.50 to 13.00
No. 2 busheling	12.00 to 12.50
Drop forge flashings, 15 in. and under	11.50 to 12.00
Railroad grate bars	12.50 to 13.00
Stove plate	12.50 to 13.00
Pipes and flues	10.00 to 10.50

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Mild steel bars	3.00c.
Cold-finished rounds and hexagons	3.90c.
Cold-finished flats and squares	4.40c.
Hoops and bands	2.65c.
No. 28 black sheets	3.81c. to 3.85c.
No. 10 blue annealed sheets	3.15c.
No. 28 galvanized sheets	4.76c. to 5.00c.
No. 9 annealed wire, per 100 lb	$3.00
No. 9 galvanized wire, per 100 lb	3.45
Common wire nails, base, per keg	3.00

Pittsburgh Iron and Steel Market

(*Concluded from page 730*)

for 10,000 tons of No. 1 railroad steel, and on a sale of approximately 15,000 tons of the same kind of material to another consumer as much as $19 is reported to have been paid. On the right sort of heavy melting steel in sizable quantities, the market is not below $18.50, and taking in the ordinary material, the quotable market is from $18 to $19. There are many rejections at some points on account of quality. This is a rather bearish development because it suggests that consumers are not short of supplies; when they are, they are not so exacting about quality. The rise in heavy melting grade, which leaves the market only slightly below its high point early in the year, tends to enhance the value of other open-hearth grades. Foundry scrap is dull. The September scrap list of the Norfolk & Western Railway contains approximately 4000 gross tons.

We quote for delivery to consumer's mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$18.00 to $19.00
No. 1 cast, cupola size	17.00 to 17.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	18.00 to 19.50
Compressed sheet steel	17.00 to 17.50
Bundled sheets, sides and ends	16.00 to 16.50
Railroad knuckles and couplers	19.50 to 20.00
Railroad coil and leaf springs	19.50 to 20.00
Low phosphorus blooms and billet ends	21.00 to 21.50
Low phosphorus mill plates	20.50 to 21.00
Low phosphorus, light grade	18.00 to 18.50
Low phosphorus punchings	19.00 to 19.50
Steel car axles	22.50 to 23.00
Cast iron wheels	16.50 to 17.00
Rolled steel wheels	19.50 to 20.00
Machine shop turnings	13.50 to 14.00
Short shoveling turnings	14.00 to 14.50
Sheet bar crops	18.00 to 19.00
Heavy steel axle turnings	15.50 to 16.00
Short mixed borings and turnings	13.00 to 13.50
Heavy breakable cast	16.00 to 16.50
Cast iron borings	13.00 to 13.50
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	18.00 to 19.00
Railroad or automobile malleable scrap	18.00 to 18.50

San Francisco

Southern Pacific Buys 23,691 Tons of Rails—Heavy Pack of Salmon

SAN FRANCISCO, Sept. 4 (*By Air Mail*).—The leading feature of the local iron and steel market during the past week was the placing of 23,691 tons of 75-lb. standard-section rails by the Southern Pacific Co., San Francisco. Of this tonnage, 13,691 tons went to the Bethlehem Steel Corporation, and 10,000 tons to the United States Steel Products Co. Partly because of the approaching holiday fresh inquiry has been slow in developing in nearly all departments of the market. Despite the local carpenters' strike which has been in progress since April 1, San Francisco building permits issued in August totaled $4,163,510, as against $3,840,076 for the eighth month of last year.

Pig Iron.—A local importer has received a shipment of about 200 tons of Indian foundry iron, which is offered at about $25, duty paid, f.o.b. cars San Francisco. German foundry is selling at about $24.25. Current sales, for the most part, are limited to small tonnages.

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**English foundry, sil. 2.75 to 3.25	25.00
**Indian foundry, sil. 2.75 to 3.25	25.00
**German foundry, sil. 2.75 to 3.25	24.25
**Dutch foundry, sil. 2.75 to 3.25	22.50
**Belgium foundry, sil. 2.75 to 3.25	22.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—Structural lettings for the week call for about 900 tons; fresh inquiries total 1645 tons. The largest individual award, 700 tons, for a bridge at Brewster, Wash., was taken by an unnamed fabricator. In San Francisco the new St. Joseph's Hospital will require 750 tons instead of 180 tons, as originally reported. Foreign material is quoted at about $10 to $12 per ton below domestic steel. Practically all of the Eastern mills are quoting plain material at 2.35c., c.i.f. Coast ports.

Plates.—Bids have been taken on 7000 tons for a penstock and pipe line for the Southern California Edison Co. at San Diego. The Shell Oil Co., Los Angeles, has placed 620 tons for two 80,000-bbl. tanks with the Llewellyn Iron Works and the Lacy Mfg. Co. Little fresh inquiry has come out for figures. Eastern mills quote plates at 2.30c., c.i.f. Coast ports.

Bars.—With the stiffening of quotations on foreign reinforcing and soft steel bars, local bar jobbers' quotations on domestic steel tend to strengthen. Foreign reinforcing bars are now being quoted at about 1.90c. to 2c., duty paid, c.i.f. Coast ports, although 1.75c. is understood to have been quoted recently. Jobbers of imported concrete bars are asking about 2.10c. to 2.15c., base, per lb. on lots of about 200 tons, although it is understood that these prices have been shaded recently. Merchant bars are quoted at about 1.70c. to 1.80c., duty paid, c.i.f. Coast ports. Local jobbers quote domestic reinforcing steel at about 2.50c. to 2.65c., base, per lb. on carload lots, and 2.80c. to 3c., base, per lb., on less-than-carload lots.

Cast Iron Pipe.—Little fresh business has come out during the week. Quotations are unchanged at $50 to $52, base, water shipment San Francisco. The city of Seattle, Wash., has placed 456 tons with B. Nicoll & Co. for street improvements, of which 154 tons is 8-in. Class B and 302 tons is 8-in. Class C pipe.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.30c.
Mild steel bars and small angles	3.30c.
Small channels and tees, ¾-in. to 2¾-in.	3.90c.
Spring steel, ¾-in. and thicker	7.00c.
No. 28 black sheets	4.90c.
No. 10 blue annealed sheets	3.90c.
No. 28 galvanized sheets	6.00c.
Common wire nails, base per keg	$3.75
Cement coated nails, base per keg	3.00

Steel Pipe.—During the week one of the intercoastal steamship companies is understood to have quoted 17c. per 100 lb. as a freight rate on steel pipe applying on water shipments from Atlantic ports via the Panama Canal to San Francisco, based on a proposed contract calling for monthly shipments of 1000 tons for one year. Some of the local buyers of pipe are understood to be considering the feasibility of pooling their orders so as to take advantage of this exceptionally low freight rate. The Standard Oil Co. of California has placed 200 tons of 3, 4, 6 and 8-in. standard line pipe with an unnamed producer.

Warehouse Business.—Local jobbers are changing their lists on galvanized and black sheets to conform to the new mill basing. New warehouse quotations on sheets are expected to be announced within a few days. Buying from warehouse has been rather sluggish.

Tin Plate.—A local firm has taken 500 base boxes for shipment to China. Little inquiry has yet developed in the local market. A Government fishery official has issued a statement showing that the canned salmon pack to date is 1,853,206 cases, while in 1924, the year when canners made their record pack, the total on Sept. 1 was 933,306 cases.

Sheets.—Mill prices both on black and galvanized sheets are now based on No. 24 gage, instead of No. 28 gage, as heretofore. Quotations are as follows: No. 24 gage black sheets, 3c., base Pittsburgh; No. 24 gage galvanized sheets, 3.85c., base, and No. 10 gage blue annealed sheets, 2.25c. to 2.30c., base. No. 28 gage galvanized sheets take an extra of 50c. per 100 lb. and No. 28 gage black sheets take an extra of 25c.

Coke.—Because of the substantial buying during July and August little fresh business is expected to develop for several weeks. German by-product coke is quoted at about $12 to $12.50 per net ton at incoming dock.

Birmingham

Rail Output at Capacity—Deadlock in Pig Iron Market

BIRMINGHAM, Sept. 7.—Larger melters of pig iron are postponing purchases in anticipation of a reduction in price, while furnaces continue to adhere to a quotation of $21, base Birmingham, on foundry grade. Current buying is limited largely to small lots for early shipment, and while it is hoped that contracting for fourth quarter will set in soon, little action in that direction has yet been taken. The melt in foundries in this district is well maintained except in soil pipe shops. The decline in iron consumption by the soil pipe industry, however, may be made up, in part, by the melt of a number of new plants. The M. & H. Valve & Fittings Co., for example, will start operations at Anniston, Ala., in a few weeks and will melt about 25 tons a day. Fourteen blast furnaces in this State continue to produce foundry iron. The Sloss-Sheffield Steel & Iron Co. is relining its No. 5 furnace at North Birmingham. Furnaces in the northwestern part of the State are making heavier water shipments against contracts in the St. Louis territory.

We quote per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 2 foundry, 1.75 to 2.25 sil.	$21.00
No. 1 foundry, 2.25 to 2.75	21.50
Basic	21.00
Charcoal, warm blast	30.00

Rolled Steel.—Although the total output of the Steel Corporation mills at Ensley, Ala., showed a slight decline in August, the rail mill has been running day and night and still has much work ahead of it. It is said that rail requirements in the South will be heavy for at least two years. Cotton tie production in this district showed a gain this year, and the output of reinforcing bars is large. Wire and nails are in good demand. Birmingham mills are getting a larger share of the business in the Southwest and are making heavier shipments to warehouses at New Orleans, Houston and other points to take care of that trade. Plate

fabricators are busy building storage tanks for the oil fields, and structural steel shops also are well booked. Work on the four new open-hearth furnaces at Fairfield, Ala., has been speeded up in the hope of completing them several weeks sooner than originally planned.

Cast Iron Pipe.—Although there has been a slight recession in new business, the present backlog of pipe shops is so large that operations are being pressed to capacity. The American Cast Iron Pipe Co. is steadily increasing production in its new centrifugal pipe shop. Shipments are heavy. Prices are unchanged at $40 per net ton, Birmingham, for 6-in. and larger pipe.

Coke.—All by-product coke plants are running at capacity, and no surplus stock has been accumulated except at the ovens of iron and steel plants. Prices on foundry coke are unchanged at $5.50 to $6 per net ton, Birmingham.

Old Material.—The market is quiet and weak. Consumption of scrap by the larger users shows no recession. They are not buying new supplies, however, since they still have material due them on contract.

We quote per gross ton, f.o.b. Birmingham district yards, as follows:

Cast iron borings, chemical	$15.00 to $16.00
Heavy melting steel	12.00 to 13.00
Railroad wrought	12.00 to 13.00
Steel axles	17.00 to 18.00
Iron axles	17.00 to 18.00
Steel rails	13.00 to 14.00
No. 1 cast	16.50 to 17.00
Tramcar wheels	16.00 to 17.00
Carwheels	16.00 to 16.50
Stove plate	14.00 to 14.50
Machine shop turnings	7.50 to 8.00
Cast iron borings	7.50 to 8.00
Rails for rolling	15.00 to 16.00

St. Louis

Texas Ruling Expected to Increase Demand for Oil Storage Tanks

ST. LOUIS, Sept. 7.—Sales of pig iron during the last week amounted to about 2500 tons, 500 tons of which went to an Iowa implement manufacturer, while the remainder was in small lots. There are few inquiries. Melters in the district, especially the larger steel plants, are busy, but heavy purchases made earlier in the summer gave them a sufficient supply of iron to last through third quarters and in some instances well into the last quarter of the year. Prices are unchanged.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices, $2.16 freight from Chicago, $4.42 from Birmingham, all rail, and 81c. average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$22.66 to $23.16
Northern malleable, sil. 1.75 to 2.25	22.66 to 23.16
Basic	23.16 to 24.16
Southern fdy., sil. 1.75 to 2.25	24.42 to 25.42
Granite City iron, sil. 1.75 to 2.25	22.81 to 23.31

Coke.—A good demand is reported for all grades of coke, especially foundry coke. Dealers in domestic grades are buying more liberally. Shipments from by-product ovens in the district have been heavy.

Finished Iron and Steel.—The National Enameling & Stamping Co. has changed the base gage and extras on galvanized and black sheets in line with the action of the Youngstown Sheet & Tube Co. The district maker also reports that its sheet mills are now operating on 100 per cent production schedules, there being a good demand for sheets. The action of the Texas authorities in forbidding earthen storage of crude oil is expected to result in a strong demand for plates for tanks. Warehouse business during August is better than it was a year ago, but not so good as in July. Trade from the oil fields has been good. The National Enameling company has advanced blue annealed sheets $2 a ton to 2.72c., delivered St. Louis, the equivalent of 2.50c., Gary.

Old Material.—Dealers are paying more for railroad lists, because they believe the market will be stronger within the next few weeks, when deliveries will be made by the railroads. Spot material is not in active demand. Dealers' expectations are based on higher prices in the East and in Chicago, and the belief that consumers will soon find it necessary to resume buying.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$12.00 to $12.50
Rails for rolling	16.75 to 17.25
Steel rails less than 3 ft.	16.75 to 17.25
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00
Cast iron car wheels	15.25 to 15.75
Heavy melting steel	13.75 to 14.25
Heavy shovelling steel	13.75 to 14.25
Frogs, switches and guards cut apart	15.50 to 16.00
Railroad springs	17.50 to 18.00
Heavy axle and tire turnings	11.00 to 11.50
No. 1 locomotive tires	16.00 to 16.50
Per Net Ton	
Steel angle bars	13.00 to 13.50
Steel car axles	19.25 to 19.75
Iron car axles	21.00 to 21.50
Wrought iron bars and transoms	20.25 to 20.75
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	12.25 to 12.75
Cast iron borings	10.00 to 10.50
No. 1 busheling	10.75 to 11.25
No. 1 railroad cast	14.75 to 15.25
No. 1 machinery cast	17.00 to 17.50
Railroad malleable	13.25 to 13.75
Machine shop turnings	7.00 to 7.50
Bundled sheets	8.00 to 8.50

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, mild steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
No. 28 black sheets	4.60c.
No. 10 blue annealed sheets	3.60c.
No. 28 galvanized sheets	5.50c.
Black corrugated sheets	4.65c.
Galvanized corrugated sheets	5.75c.
Structural rivets	3.65c.
Boiler rivets	3.85c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller	70
Machine bolts	50 and 5
Carriage bolts	47½
Lag screws	55 and 5
Hot-pressed nuts, square, blank or tapped	2.25c. off per lb.
Hot-pressed nuts, hexagons, blank or tapped	3.75c. off per lb.

Toronto

Mills Busy on Rail Orders—Election a Market Factor—Scrap Demand Better

TORONTO, ONT., Sept. 7.—Notwithstanding reports of curtailed operations of mills and steel plants of Canada during the past month or so, the situation has changed during the past week or two, since both the British Empire Steel Corporation and the Algoma Steel Corporation have recently taken orders which will enable them to continue operations for some time to come. The Algoma Steel Corporation, Sault Ste. Marie, Ont., has received a large order from the Canadian Pacific Railway Co. for 100-lb. rails, the exact tonnage not having been announced. As a result, the rail mill at Sault Ste. Marie started Sept. 1. The open-hearth furnaces of the Algoma Steel Corporation are also in operation, and both merchant mills are busy, one on double and the other on single turn.

The British Empire Steel Corporation recently took an order for 25,000 tons of rails from the Canadian Pacific Railway Co., the first received from that railroad in 17 years with the exception of a small trial order of 1300 tons rolled last year. Rolling on this order was started on Aug. 30. It is understood that the Canadian National Railways will also place rail contracts with the British Empire Steel Corporation and the Algoma Steel Corporation. The British Empire company has received large nail orders, which will keep its wire and nail departments going for about four months. The Steel Co. of Canada, Ltd., Hamilton, Ont., also reports good business. At present the Hamilton mills are running at about 70 per cent of capacity in practically all departments. It is now believed that financial reports of Canadian mills for this year will show general improvement over those issued for the previous year. The British Empire

company has blown in a second blast furnace at Sydney, N. S., Two blast furnaces are blowing at Hamilton, Ont., and two at Sault Ste. Marie, Ont., making a total of six in the Dominion.

Foundries throughout eastern Canada have failed to show much change for the better in operations, and throughout the greater part of the year have not run at much better than 50 per cent. During the past two or three weeks, however, the demand for foundry and malleable pig iron in the Canadian market has been fairly active. The greater part of current sales have been in lots ranging from 100 to 200 tons for spot delivery, but some orders for stock of 500 to 600 tons have been closed. Inquiries are making their appearance for last quarter iron needs, but contracts have been coming in slowly.

The general election, which will be held in Canada, Sept. 14, has had a tendency to hold back business in the iron and steel industry. During the past four years, with the Liberal party in power, a number of tariff reductions have been made, which, according to some leading steel interests here, have put the industry in a rather precarious position. Many leading steel men in this country are hoping for a Conservative victory, because they believe it would result in more protection.

Iron and steel warehouses report that their bookings so far this year greatly exceed those for the corresponding eight months of 1925.

Structural steel sales have been a strong feature of the market. Large tonnage structural steel orders have been placed in connection with the South Shore Bridge, Montreal, and by the Aluminum Co. of Canada, as well as for other buildings. The automotive industry and railway car builders have been extensive purchasers of sheets and plates, although demand for those products generally has fallen off somewhat within the past couple of weeks.

Old Material.—Iron and steel scrap sales for the past week showed some improvement over those of the two or three weeks previous, but in nearly all cases orders were for immediate delivery. While a steady demand for old material is reported on spot account, melters are showing little interest in future needs. In the Montreal district practically the same conditions exist as in Ontario. Foundries are making purchases of limited tonnages of machinery cast, malleable scrap and stove plate. In the Montreal district a good demand is reported for wrought iron and steel axles and dealers appear anxious to pick up these materials whenever available. Montreal dealers also report improved demand on export account. Canadian dealers' buying prices are as follows:

Per Gross Ton	Toronto	Montreal
Steel turnings	$8.50	$8.00
Machine shop turnings	8.50	8.00
Wrought pipe	6.00	6.00
Rails	11.00	10.00
No. 1 wrought scrap	11.00	14.00
Heavy melting steel	11.00	9.00
Steel axles	16.00	17.00
Axles, wrought iron	18.00	19.00
Per Net Ton		
Standard carwheels	15.00	16.00
Malleable scrap	14.00	14.00
Stove plate	10.00	13.00
No. 1 machinery cast	16.00	18.00

Data Sought on Freight Rate Structure

WASHINGTON, Sept. 3.—Additional data are sought by the Interstate Commerce Commission concerning rate structures and the origins, destinations, and trends of traffic. The information is wanted in connection with an investigation authorized by Congress under the so-called Hoch-Smith resolution.

Questionnaires have been sent to carriers by territories or groups. The commission has asked data from 15 groups, 12 within the United States, two for Canadian traffic, and one for Mexican traffic. The carriers have been given two forms of questionnaires: the first, for reporting as to commodities which are not customarily accorded transit, which is to be executed by the originating carriers; and the second, for reporting as to commodities which are customarily accorded transit, which is to be executed by the delivering carriers.

Buffalo

Steel Company Producer of Merchant Pig Iron Withdraws from Market

BUFFALO, Sept. 7.—Although large inquiries for pig iron are lacking, pending business totals 5000 tons. There has been a slight improvement in sales, with some orders placed without broadcasting inquiries. Specifications against old contracts are good, and furnaces believe that a stiffening of the market will occur shortly. One producer has withdrawn from the market for the remainder of the year because of the demand of its steel-making department, and another steel works which has been selling merchant pig iron is less active than before. Foundry iron is still held at $20, base Buffalo, for shipments into this district, while lower quotations are made on business taken in outside territories.

We quote prices per gross ton, f.o.b. Buffalo, as follows:

No. 2 plain fdy., sil. 1.75 to 2.25	$19.00 to $20.00
No. 2X foundry, sil. 2.25 to 2.75	19.50 to 20.50
No. 1X foundry, sil. 2.75 to 3.25	20.50 to 21.50
Malleable, sil. up to 2.25	20.00
Basic	19.00
Lake Superior charcoal	29.28

Finished Iron and Steel.—Steel mills report business as satisfactory, with bar specifications especially good. Bars are quoted at 2.265c. to 2.365c., Buffalo, for third quarter shipment and at 2.365c. for fourth quarter. Reinforcing bar demand is good, with 2.265c., Buffalo, being quoted on mill shipments and 2.75c. on deliveries from stock. One current inquiry calls for 400 tons of reinforcing bars. Warehouse demand is good. A new base and revised differentials on sheets and a new extra card on cement-coated nails will be effective this week. Mill operations average 85 per cent.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Mild steel bars	3.30c.
Cold-finished shapes	4.45c.
Rounds	3.95c.
No. 28 black sheets	4.45c.
No. 10 blue annealed sheets	3.80c.
No. 28 galvanized sheets	5.60c.
Common wire nails, base per keg	$3.90
Black wire, base per 100 lb	3.90

Old Material.—The market for heavy melting steel, No. 1 grade, ranges from $18 to $18.25, and the more ordinary grade is firm at $17. Brokers are also paying these prices. There is good demand for hydraulic compressed sheets and No. 1 busheling. Stove plate finds takers at $15.75. Inquiry for No. 1 cast has fallen off, following the placing of considerable business. Stocks are low throughout the district, and this may lead to higher prices if steel mill operations are maintained at their present rate.

We quote prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$16.50 to $17.00
Selected No. 1 heavy melting steel	18.00 to 18.50
Low phosphorus	18.50 to 19.00
No. 1 railroad wrought	15.00 to 15.50
Carwheels	17.00 to 17.50
Machine shop turnings	10.50 to 11.00
Mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 13.00
No. 1 busheling	17.00 to 17.50
Stove plate	15.25 to 15.50
Grate bars	14.00 to 14.50
Hand bundled sheets	12.00 to 12.50
Hydraulic compressed	17.00 to 17.50
No. 1 machinery cast	16.00 to 16.25
Railroad malleable	16.50 to 17.00
Iron axles	24.00 to 25.00
Steel axles	16.00 to 16.50
Drop forge flashings	13.75 to 14.25

Traffic through the Sault Ste. Marie canals in August is reported by the Corps of Engineers, United States Army, at 3226 vessel passages, of which 2759 went through the American canal. Iron ore, east-bound, amounted to 10,684,548 net tons—all through the American canal. East-bound pig iron, 10,199 net tons, and west-bound "manufactured iron and steel," 19,926 tons, were included in the statement.

Boston

Pig Iron Quotations Raised—Record Business in Small Cast Pipe

BOSTON, Sept. 7.—Current business in pig iron is confined to small lots. One furnace took an aggregate of about 1000 tons the past week, and another approximately as much, but their total sales probably did not exceed 3000 tons. A Massachusetts foundry has intimated it will be in the market for 500 tons of No. 2X and No. 1X iron within a week. Three or four smaller tonnages are under consideration, but as most New England melters are well protected for fourth quarter, not much activity is anticipated in this market until books for the first quarter of 1927 are opened. The Mystic Iron Works announces that it will be making and shipping iron in about a week. Following the similar action recently taken by New York State furnaces, the company has advanced prices 50c. a ton, to $20.50, base Everett.

We quote delivered prices on the basis of the latest sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 1.75 to 2.25	$24.15 to $24.65
East. Penn., sil. 2.25 to 2.75	24.65 to 25.15
Buffalo, sil. 1.75 to 2.25	22.91 to 23.91
Buffalo, sil. 2.25 to 2.75	23.41 to 24.41
Virginia, sil. 1.75 to 2.25	27.92 to 28.42
Virginia, sil. 2.25 to 2.75	28.42 to 28.92
Alabama, sil. 1.75 to 2.25	30.60
Alabama, sil. 2.25 to 2.75	31.10

Cast Iron Pipe.—Sales last month of small pipe, particularly of 6 and 8-in., both in New England and the country at large, were the largest for any August in the history of the industry, according to local representatives of pipe foundries. East Hartford, Conn., has awarded 1400 tons of 6 to 16-in. pipe to the United States Cast Iron Pipe & Foundry Co. The Warren Foundry & Pipe Co. has taken, through contractors, 500 tons of 20-in. pipe for the Marblehead, Mass., sewer outfall, and has also been awarded 400 tons of 24-in. pipe by Manchester, N. H. Bids will be opened Sept. 8 at Salem, Mass., on 6000 tons of 24 to 54-in. pipe required for the South Essex, Mass., sewerage department. Prices quoted openly on domestic pipe follow: 4-in., $60.10 a ton, delivered common Boston freight rate points; 6 to 12-in., $55.10 to $56.10; larger pipe, $54.10 to $55.10. The usual $5 differential is asked for Class A and gas pipe.

Coke.—Local producers of by-product foundry coke report a slight improvement in contract specifications, but shipments are by no means as large as they were a year ago. Winter stocking by foundries, it is believed, will start around the middle of the month. The New England Coal & Coke Co. and the Providence Gas Co. are still quoting $12 a ton, delivered within a $3.10 freight rate zone. The demand for domestic coke has developed rapidly the past week, owing to much lower temperatures. The market for low volatile coal in Boston has slowed up somewhat because of the strength of prices.

Old Material.—The scrap situation has become somewhat mixed. Some houses report business as holding at its previous level, while others are booking less tonnage. Collectively, shipments out of New England the past week showed a slight falling off. Heavy melting steel continues in excellent demand, with some sales reported at as high as $12.50 a ton on cars shipping point, a new peak price for this movement. The market for machine shop turnings and mixed borings and turnings, on the other hand, is easier, since shippers have practically filled orders on their books. In contrast, prices for cast iron borings, both chemical and rolling mill, are very firm, and there is still a good market for forged scrap and bundled skeleton. There is practically no call for wrought material. For textile machinery $19 a ton delivered is about the best old material dealers can do. Sales of selected No. 1 machinery cast were made last Saturday at $19, but the general range of prices on such material is $18 to $18.50, with few takers. Sales of stove plate and railroad malleable for New England consumption are practically nil.

The following prices are for gross-ton lots delivered consuming points:

Textile cast	$18.50 to $19.00
No. 1 machinery cast	18.00 to 18.50
No. 2 machinery cast	16.00 to 16.50
Stove plate	18.00 to 18.50
Railroad malleable	19.50 to 20.00

The following prices are offered per gross-ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.00 to $12.50
No. 1 railroad wrought	12.50 to 13.00
No. 1 yard wrought	11.25 to 11.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	11.00 to 11.25
Machine shop turnings	8.75 to 9.00
Cast iron borings, chemical	11.00 to 11.50
Cast iron borings, rolling mill	9.00 to 9.50
Blast furnace borings and turnings	8.00 to 8.50
Forged scrap	9.50 to 10.00
Bundled skeleton, long	9.50 to 10.00
Forged flashings	9.50 to 10.00
Bundled cotton ties, long	8.50 to 9.00
Bundled cotton ties, short	9.50 to 10.00
Shafting	16.50 to 17.00
Street car axles	16.00 to 17.00
Rails for rerolling	12.50 to 13.00
Scrap rails	11.75 to 12.25

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Soft steel bars and small shapes	3.265c.
Flats, hot rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Plates	3.365c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hexagons	3.95c.
Squares and flats	4.45c.
Toe calk steel	6.00c.

Cincinnati

Lake Furnaces Take Bulk of Current Pig Iron Business

CINCINNATI, Sept. 7.—There has been no diminution in the activities of northern Ohio furnaces in this territory, and Lake producers are said to be naming prices as low as $18 to $18.25, base furnace, to secure business which otherwise probably would go to sellers in the Ironton district. Included in the tonnage booked by Lake interests in the past week were 500 tons for the Lunkenheimer Co., Cincinnati, and 750 tons for the Favorite Stove Co., Piqua, Ohio. Southern Ohio furnaces continue to sell small lots of foundry iron at $20, base furnace, but they cannot extend their sales into all parts of their natural territory with both Lake and Valley producers quoting low prices. Bookings of Jackson County silvery iron have increased. A Michigan melter has taken 1000 tons for fourth quarter delivery. Malleable iron nominally is quoted at $19.50, base furnace, but concessions of 50c. a ton probably would be made to obtain an attractive order. The lone active producer in Tennessee continues out of the market. Alabama iron is bringing $21, base Birmingham, but only small quantities are moving north of the Ohio River. The Belfont furnace of the Belfont Steel & Wire Co., Ironton, Ohio, is banked temporarily for repairs. Aside from an inquiry for 1000 tons of malleable from the Springfield, Ohio, plant of the International Harvester Co., prospective business is light.

Based on freight rates of $3.69 from Birmingham and $1.89 from Ironton, we quote f.o.b. Cincinnati:

Alabama fdy., sil. 1.75 to 2.25 (base)	$24.19 to $24.69
Alabama fdy., sil. 2.25 to 2.75	24.69 to 25.19
Tennessee fdy., sil. 1.75 to 2.25	24.69
Southern Ohio silvery, 3 per cent	29.39
So. Ohio fdy., sil. 1.75 to 2.25	21.39 to 21.89
So. Ohio malleable	20.89

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, mild steel or iron	3.20c. to 3.30c.
Reinforcing bars	3.20c. to 3.30c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Open-hearth spring steel	4.75c. to 5.00c.
No. 24 black sheets	4.05c.
No. 10 blue annealed sheets	3.60c.
No. 24 galvanized sheets	4.90c.
Structural rivets	3.75c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base per 100-lb. keg	3.15
Chain, per 100 lb	7.55
	Net per 100 Ft.
Lap welded steel boiler tubes, 2-in	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in	19.00
4-in.	39.00

Finished Material.—While there has been a slight decline in specifications and orders in the past week, the tonnage in the aggregate was exceptionally satisfactory for this time of the year. Agricultural implement manufacturers are beginning to inquire for material and are expected to make heavy purchases in the near future. Railroads and electric traction companies also will be important factors in the market this fall it is believed. The Louisville & Nashville Railroad is reported to be considering the purchase of a large tonnage of track accessories. Deliveries of many commodities have lengthened appreciably in the last two weeks. Some producers are unable to ship certain materials in less than four weeks. Fourth quarter business now is being booked, but mills are not eager to enter into contracts unless their customers insist upon such an arrangement. The change in the base grades of black and galvanized sheets from No. 28 to No. 24 gage is being accomplished with little confusion. Two nearby producers have announced their adherence to the new schedule. Sheet specifications and orders have been consistently good. In many cases the roofing trade, especially in the South, has had an insufficient supply of galvanized sheets and has hastened to replenish its dwindling stock. Black sheets, on the new basis, are selling at 3c., base Pittsburgh, and galvanized at 3.85c., base Pittsburgh. Demand for blue annealed has been moderate. The ruling price remains 2.30c., base Pittsburgh. There is less activity in automobile body sheets, which are bringing 4.30c., base Pittsburgh. The bar market is fairly steady at 2c., base Pittsburgh. Sales of plates have fallen off somewhat, but quotations remain firm at 1.90c., base Pittsburgh. Structural shapes are holding at 2c., base Pittsburgh. The wire market is quiet at the moment.

(*Concluded on page* 746)

Growth of Metal Industries*

Record for 40 Years Since 1885 Reviewed—Sharp Gain in Non-Ferrous Output as Compared with Pig Iron

THE metal industry has been classified into two main groups, namely, the iron and steel or the ferrous group, and the non-ferrous, which comprises all other metals. In considering the production of the various metals, a good index is the production of new metal from ores. Pig iron is produced directly from iron ore, and consequently the annual production of pig iron represents fairly accurately the amount of new iron produced. In the production of steel a considerable quantity of scrap is used, so that the annual steel production is now greater than the annual pig iron production.

In the non-ferrous field metals are divided into primary metals mainly produced from the ores, and secondary metals obtained by the reclamation of scrap material. Comparisons of production should not include the reclamation of scrap. In comparing the ferrous and non-ferrous metal industries I shall therefore consider the world production of pig iron and the world production of primary non-ferrous metals.

World Output of Pig Iron and Non-Ferrous Metals

The world production of pig iron in the year 1800 was about 800,000 metric tons. The maximum world production of pig iron, including the year 1924, was in 1913, when 79,100,000 tons were produced. Fig. 1 shows the world production of pig iron by 5-year periods for the last 40 years. It will be noted that the highest production occurred between 1910 and 1914, inclusive, and that the world production during the last five years was exceeded by each of the three previous 5-year periods.

Fig. 2 shows the world production of pig iron for the last 40 years in 5-year periods in one column and the world production of all non-ferrous metals for the same 5-year periods in another column, both charted to the same scale. This brings out strikingly the great preponderance of the iron and steel industry as compared to the non-ferrous metals industry as regards tonnage.

In the year 1800 about 7 tons of non-ferrous metals were produced for each 100 tons of pig iron. By 1850 the amount had been reduced to 5.85 tons, and in 1880 to 4.37 tons of non-ferrous metals for each 100 tons of pig iron. The accelerated pig iron production during this period obviously reflects the advent of the open-hearth and Bessemer processes for converting pig iron into steel, and

*From the Robert Henry Thurston lecture delivered before the annual meeting of the American Society of Mechanical Engineers, by Dr. Zay Jeffries, metallurgical engineer Aluminum Co. of America, Cleveland.

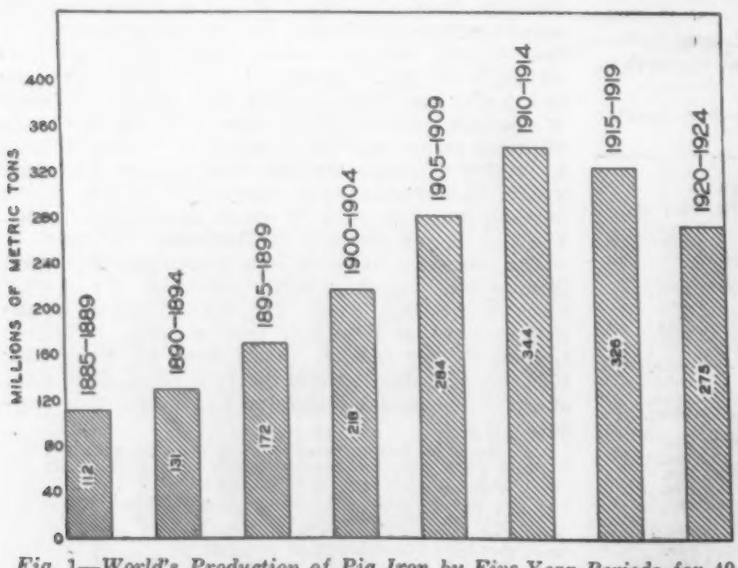


Fig. 1—World's Production of Pig Iron by Five-Year Periods for 40 Years

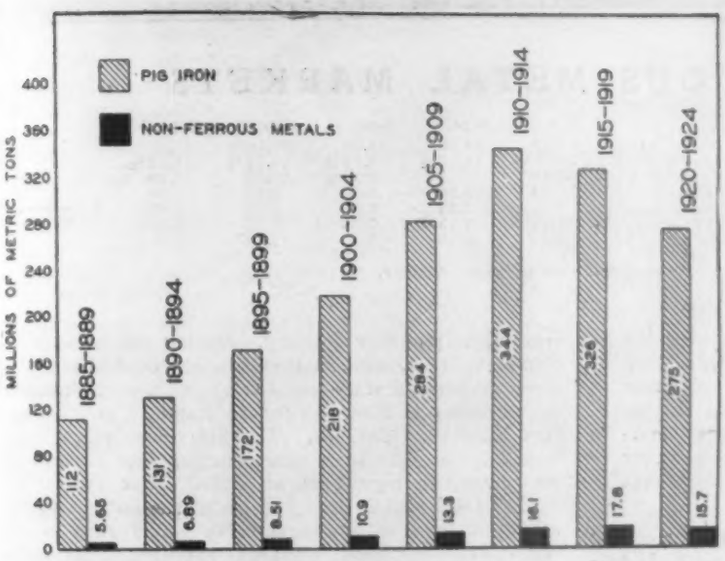


Fig. 2—World's Production of Pig Iron for the Last 40 Years in 5-Year Periods in One Column and the World's Output of All Non-Ferrous Metals for the Same 5-Year Periods in the Solid Black Column, Both Charted to the Same Scale

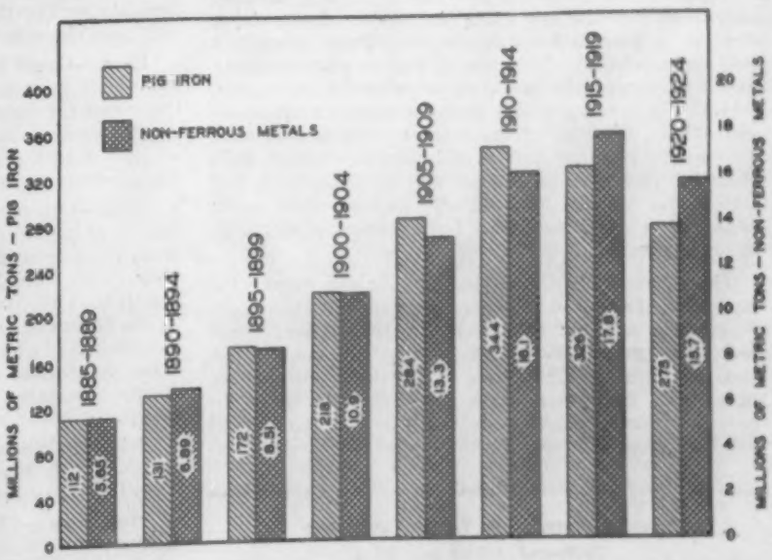
Fig. 3 (Below)—The Non-Ferrous Metal Production of the World Charted on a Scale 20 Times That of the Production of Pig Iron

the tremendous growth of the railroads and other industries in which iron and steel were the chief construction materials.

Relative Growth of Non-Ferrous and Pig Iron Industries

In order to obtain an idea as to the relative growth of the ferrous and non-ferrous metal industries during the last 40 years, Fig. 3 has been prepared in which the non-ferrous metal production is charted to a scale 20 times that of the production of pig iron. It will be noted that the production of pig iron has been substantially greater than 20 times that of the non-ferrous metals for the first 30 years of the period covered, namely, from 1885 to 1914 inclusive, whereas during the last 10 years the production of pig iron has been considerably less than 20 times that of the non-ferrous metals. The average of the 40 years is 5.09 tons of non-ferrous metals for each 100 tons of pig iron produced, whereas in the period 1915 to 1919 and 1920 to 1924 inclusive, 5.47 and 5.70 tons respectively were produced for each 100 tons of pig iron.

In 1924, 6.44 tons of non-ferrous metals were produced for each 100 tons of pig iron, which represents the largest ratio for more than 75 years. Furthermore, the world production of pig iron for 1924 (63,900,000 metric tons) was exceeded in eight separate previous years, namely, 1910, 1912, 1913, 1915, 1916, 1917, 1918 and 1923. On the other hand, the production of non-ferrous metals in 1924 was the largest in history (4,116,000 metric tons), exceeding the 1917 production.



REINFORCING STEEL

Week's Awards Total 5000 Tons, with 2800 Tons in Pending Projects

The past week brought awards of concrete reinforcing bars totaling 5000 tons, the largest of which was a warehouse in Chicago, which took 1300 tons. Included among the jobs up for inquiry, which aggregate nearly 2800 tons, is a dock board for the Port of New Orleans calling for 1400 tons. Awards follow:

BOSTON, 300 tons, Section 2, Dorchester tunnel, Boston Rapid Transit Commission, to Portland Rolling Mill, Portland, Me.

POUGHKEEPSIE, N. Y., 700 tons, Mid-Hudson Bridge, to McClintic-Marshall Co.

CLEVELAND, 415 tons, Hollenden Hotel, to Rivet Grip Steel Co.

CLEVELAND, 260 tons, Carnegie Prospect Building, to Rivet Grip Steel Co.

CHICAGO, 160 tons of rail steel, Chatelaine Tower apartment building, to Calumet Steel Co.

CHICAGO, 1300 tons of rail steel, Central Manufacturing District warehouse, to Calumet Steel Co.

CHICAGO, 600 tons of rail steel, Stratford apartment building, to Joseph T. Ryerson & Son.

CEDAR RAPIDS, IOWA, 200 tons, city paving works, to Olney J. Dean & Co.

GOLD HILL, ORE., 122 tons, for Rogue River Bridge, to unnamed firm.

LOS ANGELES, 331 tons, for Riverside Drive and Dayton Avenue viaduct, to unnamed local jobber.

SACRAMENTO, CAL., 147 tons, for Dog Creek bridge south of Delta, Cal., for State Highway Commission, to unnamed firm.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

DECATUR, ILL., 100 tons, office building for the Wabash Railway.

CHICAGO, 175 tons, hotel at Lawrence and Kenmore Avenues; R. C. Wieboldt & Co., general contractor.

CHICAGO, 160 tons, Luke O'Toole Elementary School.

EVANSTON, ILL., 300 tons, public garage.

ST. LOUIS, 150 tons, telephone exchange, Hamilton and Natural Bridge Avenues.

NEW ORLEANS, 1400 tons, dock board of the Port of New Orleans.

DALLAS, TEX., 400 tons, for La Salle County Water Improvement District No. 1; bids to be called Sept. 15 by Nagle, Witt & Rollins Engineering Co., Allen Building, Dallas.

SACRAMENTO, CAL., 100 tons, San Lorenzo Creek bridge near Hayward, Cal., for the State Highway Commission.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Sept. 7	Sept. 4	Sept. 3	Sept. 2	Sept. 1
Lake copper, New York	14.50	14.50	14.50	14.50	14.50
Electrolytic copper, N. Y.*	14.12½	14.12½	14.12½	14.12½	14.12½
Straits tin, spot, New York	67.25	....	66.17½	65.75	66.20
Lead, New York	8.90	8.90	8.90	8.90	8.90
Lead, St. Louis	8.65	8.65	8.65	8.65	8.65
Zinc, New York	7.75	7.75	7.75	7.75	7.75
Zinc, St. Louis	7.40	7.40	7.40	7.40	7.40

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Sept. 7.—Because of the week-end holiday interval, the markets have been very quiet. Prices, however, have generally held their own and there has been no pronounced feature in any of the major metals. The strongest market has been tin, where prices have gone to higher levels. Quotations in copper, lead and zinc have been practically unchanged.

Copper.—Only moderate sales of electrolytic copper are reported for the week just ended. Nearly all producers continue to ask 14.37½c., delivered, at which levels it is generally considered only large quantities could be purchased. It is stated that smaller amounts have sold during the week at anywhere from 14.30c. to 14.35c., delivered, but the quantity involved has never been large. The tone of the market today is firm with the expectation that prices will advance rather than otherwise and that consumers will be obliged to buy more metal in the near future because their order books are in good condition. Lake copper is quoted at 14.50c., delivered.

Tin.—New high prices for the year for Straits tin were established late last week and today, when sales were made at over 66c. and 67c. respectively, New York, for spot delivery. In general the market has been only moderately active, with sales totaling over 1000 tons. Consumers have been showing more interest and have bought more freely and it is conceded that they must buy considerable metal yet for October-November-December delivery. During the holiday recess here, the London market has advanced sharply, or about £6 per ton since last Friday, with spot Standard quoted today at £300 5s., future standard at £296 and spot Straits at £307 5s. The Singapore price today was £302 7s. 6d. In a quiet market spot Straits tin was quoted in New York at 67.25c., New York. The world's total visible supply of tin at the end of August at 13,352 tons, as compared with 13,777 tons at the end of July, was about what was expected in the trade. Arrivals so far this month have been 265 tons, with 4822 tons reported afloat.

Lead.—Conditions have scarcely changed. There is a fair consuming demand and no trouble in securing the metal for prompt shipment. The American Smelting & Refining Co. continues to quote 8.90c., New York, as its contract price, with the quotation of the principal producer of the Middle West at 8.65c., St. Louis.

Zinc.—Demand from galvanizers continues moderate and there has been no reason for quotations to fluctuate from the minimum price of 7.40c., St. Louis, or 7.75c., New York, which has prevailed for early delivery throughout the week. Some sellers are optimistic as to the future of the metal and feel that the increase in consumption, which is generally believed to exist, will more than offset any expected increase in output, due to larger number of retorts active on the first of the month.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c., with shot nickel at 36c. per lb. Electrolytic nickel is obtainable at 39c.

Antimony.—Chinese metal is stronger with spot delivery quoted at 16c. to 16.50c., with future shipment at 15.75c. Political conditions in China have not improved.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 27c. to 28c. per lb., delivered.

Metals from New York Warehouse

Delivered Prices per Lb.

Tin, Straits pig	69.00c. to 69.25c.
Tin, bar	70.75c. to 71.25c.
Copper, Lake	15.50c.
Copper, electrolytic	15.25c.
Copper, casting	14.75c.
Zinc, slab	8.50c. to 9.00c.
Lead, American pig	9.50c. to 10.00c.
Lead, bar	11.50c. to 12.50c.
Antimony, Asiatic	18.00c. to 19.00c.
Aluminum, No. 1 ingot for remelting (guaranteed over 99 per cent pure)	30.00c. to 30.50c.
Babbitt metal, commercial grade	30.00c. to 35.00c.
Solder, ½ and ½	41.00c. to 42.00c.

Metals from Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	69.75c.
Tin, bar	72.75c.
Copper, Lake	15.00c.
Copper, electrolytic	15.00c.
Copper, casting	14.00c.
Zinc, slab	8.50c.
Lead, American pig	9.75c.
Antimony, Asiatic	20.50c.
Lead, bar	11.50c.
Babbitt metal, medium grade	23.50c.
Babbitt metal, high grade	75.25c.
Solder, ½ and ½	42.25c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

Sheets—	
High brass	19.37½c. to 20.37½c.
Copper, hot rolled	23.00c. to 24.00c.
Copper, cold rolled, 14 oz. and heavier	25.25c. to 26.25c.
Seamless Tubes—	
Brass	24.25c. to 25.25c.
Copper	25.00c. to 26.00c.
Brazed Brass Tubes	27.37½c. to 28.37½c.
Brass Rods	17.12½c. to 18.12½c.

From New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks	13.00c. to 13.25c.
Zinc sheets, open	13.50c. to 13.75c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not changed since Aug. 3. Zinc sheets and lead full sheets are still holding to the changes of July 20 and 26 respectively.

List Prices Per Lb. f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. Per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	19.37½c.
Copper, hot rolled	23.00c.
Zinc	11.75c.
Lead (full sheets)	12.50c. to 12.75c.
Seamless Tubes—	
High brass	24.25c.
Copper	25.00c.
Rods—	
High brass	17.12½c.
Naval brass	19.87½c.
Wire—	
Copper	16.37½c.
High brass	19.87½c.
Copper in Rolls	21.87½c.
Brazed Brass Tubing	27.37½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of the Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	37.50c.
Tubes, base	48.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	19⅝c. to 20⅝c.
Copper, hot rolled	23c.
Copper, cold rolled, 14 oz. and heavier	25¼c.
Zinc	12.25c.
Lead, wide	11.25c.
Seamless Tubes—	
Brass	24¼c.
Copper	25c.
Brazed Brass Tubes	27⅝c.
Brass Rods	17⅛c.

Old Metals, Per Pound, New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators, and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.75c.	12.50c.
Copper, light and bottoms	9.75c.	11.25c.
Brass, heavy	7.25c.	9.00c.
Brass, light	6.25c.	8.00c.
Heavy machine composition	8.75c.	10.125c.
No. 1 yellow brass turnings	8.50c.	9.25c.
No. 1 red brass or composition turnings	8.25c.	9.25c.
Lead, heavy	7.50c.	8.00c.
Lead, tea	5.75c.	6.50c.
Zinc	4.25c.	4.75c.
Sheet aluminum	17.00c.	19.00c.
Cast aluminum	17.00c.	19.00c.

Non-Ferrous Metals at Chicago

SEPT. 7.—This market as a whole is fairly steady and the demand for all commodities is in good volume. The consumption of copper is large and the price is firm. Tin has advanced, due to the influence of a substantial buying movement, while the price of zinc is somewhat lower because of larger offerings. Transactions in old metals are about equal to the previous week and prices are steady.

We quote, in carload lots, Lake copper, 14.60c.; tin, 67c.; lead, 8.75c.; zinc, 7.50c.; in less than carload lots, antimony, 16.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.25c.; yellow brass, 8c.; lead pipe, 7.50c.; zinc, 5c.; pewter, No. 1, 35c.; tin foil, 43.50c. block tin, 52c.; aluminum, 17.75c.; all being dealers' prices for less than carload lots.

Heads of European Delegations to Foundrymen's Congress

The roster of the heads of the European delegations to the second international foundrymen's congress at Detroit during the week of Sept. 27 is as follows:

Great Britain:

S. H. Russell, vice-president Institute of British Foundrymen; partner, S. Russell & Sons, Bath Lane Foundry, Leicester, England.

John Cameron, past president 1925-1926 Institute of British Foundrymen; managing director Cameron & Roberton, Ltd., South Bank Ironworks, Kirkintilloch, near Glasgow, Scotland.

Frank Russell, official representative Refractories Association of Great Britain; managing director General Refractories Co., Ltd., Auldam House, Wortsop, Notts.

Harry Winterton, official representative Refractories Association of Great Britain; managing director William Cumming & Co., Ltd., Moorlands, Milngavie, North Britain.

France:

H. Magdalenat, vice-president Association Technique de Fonderie de France; managing director S. A. des Usines de Rosieres, Bourges.

E. V. Ronceray, vice-president Association de Technique de Fonderie de France; managing director, Etablissements Bonvillain et Ronceray, Rue Paul-Carle, Choisy-le-Roi, Seine, Paris.

Belgium:

Paul Ropsy, president Association Technique de Fonderie de Belgique; managing director Belgium Griffin Co., Merxem-les-Anvers.

Germany:

Dr. Ing. Geilenkirchen, managing director Verein Deutscher Eisengiesserein, Düsseldorf.

Dr. Ing. William M. Guertler, Metallinstitut of Technischen Hochschule, Berlin.

Italy:

Carlo Vanzetti, president Italian Foundrymen's Association; managing director of the Fonderia Milanese di Acciaio, Corso Concordia 1, Milano (21).

Holland:

T. J. Brons, official representative of Co-operative Society of Dutch Iron and Steel Founders; N. V. Appingedammer Bronsmotorenfabrick, Appingedam.

Rooms at Detroit for All Foundrymen

Rumors of lack of hotel accommodations at Detroit for the annual convention of the American Foundrymen's Association are denied by those in charge. The statement is authorized that if all applications for rooms are sent to W. J. Muhlitner, Great Lakes Foundry Sand Co., Detroit, chairman of the hotel committee, they will be take care of. Over 8000 rooms are available.

American Exports to "New" Countries Increasing Rapidly

Exports from the United States to South America and Oceania have increased 250 per cent since 1912, according to figures made public by Dr. Julius Klein, director of the Bureau of Foreign and Domestic Commerce. Meanwhile exports to Africa have doubled. "Australia and New Zealand," says Doctor Klein, "English speaking countries with standards of living and economic environment similar to those in our Middle West, find American products peculiarly and increasingly adapted to their wants."

Automobiles and trucks, radio equipment and other electrical apparatus, pianos, clocks, watches, adding and computing machines, typewriters, hardware, tools and a wide range of other manufactured articles have shown a development of exceptional strength. American sales to the two British colonies mentioned amounted in 1925-26 to nearly $200,000,000, which is approximately $30 per capita. This figure may be compared with our own aggregate imports from the entire world, which amount to about $35 per capita.

In automobiles and trucks alone Australia and New Zealand bought $54,000,000 worth in the last fiscal year, or more than six times as much as in 1922. They constitute our leading overseas market for automotive products, Argentina in second place accounting for $33,000,000 only.

Evidently this situation is causing concern in the British Empire, for press dispatches state that the New Zealand parliament has adopted tariff regularities giving preference to British automobiles. The ad valorem rate is stated at 10 per cent for British cars and 35 per cent for others.

Locomotive manufacturing plants shipped 124 engines in August, according to reports received by the Department of Commerce, Washington. This compares with 132 in July of this year and 118 in August, 1925.

FABRICATED STRUCTURAL STEEL

St. Louis Building Takes 6000 Tons—Three Philadelphia Jobs Total 6000 Tons

Probably because of the holidays, the awards of structural steel were very light in the past week, totaling only slightly more than 16,000 tons, of which 6000 tons was in one job in St. Louis. An office building in Philadelphia on which the steel will be awarded shortly calls for about 3500 tons. Awards follow:

SOUTH BRAINTREE, MASS., 400 tons of plates, standpipe, to Pittsburgh-Des Moines Co.

NEW YORK, 1650 tons, 15-story apartment building, Ninety-fifth Street and West End Avenue, New York, to Hedden Iron Construction Co.

NEW YORK, 500 tons, distributing station, New York Edison Co., West Fifty-fourth Street, New York, to Hedden Iron Construction Co.

NEW YORK, 650 tons for three and six-story apartment houses, one lot 350 tons and another 300 tons, to unnamed fabricators.

NEW YORK, 150 tons, bridge at Elmhurst, Long Island, to Harris Structural Co.

PHILADELPHIA, 1000 tons, Huntingdon Hall Apartments, Walnut and Twentieth Streets, to McClintic-Marshall Co.

PHILADELPHIA, 1500 tons, addition to plant of Edward G. Budd Mfg. Co., to Belmont Iron Works.

SYRACUSE, N. Y., 325 tons, municipal garage, to Jones & Laughlin Steel Corporation.

PITTSBURGH, 2350 tons, 15 barges for Carnegie Steel Co., to American Bridge Co.

CLEVELAND, 200 tons, warehouse for American Radiator Co., to Fort Pitt Bridge Works.

CLEVELAND, 160 tons, Hathaway Brown School, to Cleveland Structural Steel Co.

CHICAGO, 140 tons, building for the Fluck Cut Stone Co., to Abell-Howe Co., 53 West Jackson Boulevard.

ELGIN, ILL., 350 tons, Professional Building, to Rochester Bridge Co., Rochester, Ind.

ST. LOUIS, 6000 tons, St. Louis Civil Court House, to Mississippi Valley Structural Steel Co.

EAST ST. LOUIS, ILL., 450 tons, Southern Malleable Iron Co., building, to St. Louis Structural Steel Co., St. Louis.

MUSCLE SHOALS, ALA., 350 tons, outdoor substation at Wilson Dam for General Electric Co., to American Bridge Co.

NEW ORLEANS, 170 tons, Vanderbilt Street dock shed, to Rochester Bridge Co.

SACRAMENTO, CAL., 200 tons, Granada Theater, Thirty-first and K Streets, to Schrader Iron Works, San Francisco.

LOS ANGELES, 620 tons, two 80,000-bbl. tanks for the Shell Oil Co., at San Pedro, Cal., to Lacy Mfg. Co., and Llewellyn Iron Works (310 tons each).

BREWSTER, WASH., 700 tons, highway bridge for the State Highway Commission, to an unnamed fabricator; steel will be furnished by the Illinois Steel Co.

TACOMA, WASH., 150 tons, standpipe for the city of Tacoma, to Gerrick & Gerrick, Seattle.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

NEW YORK, 800 tons, American Book Bindery, Varick and King Streets; White Construction Co., contractor.

MOUNT VERNON, N. Y., 1500 tons, office building for Westchester Lighting Co.; White Construction Co., contractor.

PHILADELPHIA, 3500 tons, office building for Philadelphia Electric Co. at Ninth and Sansom Streets; general contract awarded to John M. Gill & Son, Philadelphia.

DETROIT, 100 tons, overhead trolley lines for Grand Trunk Railroad.

CHICAGO, 300 tons, Chicago Rapid Transit Co., for relocation of columns in the loop district.

CHICAGO, 390 tons, rope trolley bridge for Mead-Morrison Co.

ST. LOUIS, 900 tons, 6 barges for United States Engineers; bids open Sept. 15.

BATON ROUGE, LA., 900 tons for municipal carfloat.

TUCSON, ARIZ., 320 tons, office building.

SAN FRANCISCO, 750 tons, St. Joseph's Hospital; bids Sept. 10.

SAN FRANCISCO, 150 tons, apartment building on Larkin Street between Greenwich and Lombard Streets; bids in.

HOLLYWOOD, CAL., 425 tons, Warner Brothers Hollywood Theater; bids in.

Cincinnati Iron and Steel Market

(*Concluded from page* 742)

Common wire nails are unchanged at $2.65 per keg, Pittsburgh or Ironton, and plain wire at $2.50 per 100 lb., Pittsburgh or Ironton. Bookings of cold-rolled steel have decreased.

Reinforcing Bars.—No sizable projects have appeared in the past week, and sales have been confined to small lots, ranging from 25 to 75 tons. New billet bars are quoted at 2c., base Pittsburgh, and rail steel bars at 1.90c., mill.

Warehouse Business.—The volume of business has held up well in the past week. Sales have been distributed among all products except structural steel, in which the tonnage has been disappointing. Particularly outstanding is the demand for heavy tank plates. To conform with the new base prices on black and galvanized sheets local jobbers have issued a card containing revised quotations on No. 24 gage and the extras on other gages. Otherwise prices are unchanged.

Coke.—An appreciable increase in foundry operations has brought out better specifications and orders for by-product foundry coke. New River foundry grades are moving at a moderate rate, while furnace coke from the Wise County district is showing strength at $3.75 to $4 per net ton, f.o.b. ovens. The curtailment of blast furnace operations in southern Ohio has thrown liberal tonnages of furnace coke on the market. By-product domestic coke is in good demand. Prices are steady and unchanged.

Based on freight rates of $2.14 from Ashland, Ky., $3.53 from Connellsville, and $2.59 from Wise County ovens and New River ovens, we quote f.o.b. Cincinnati: Connellsville foundry, $7.53 to $8.53; Wise County foundry, $7.09 to $7.59; New River foundry, $9.59 to $10.09; by-product foundry, $9.64.

Old Material.—Further reaction from the recent bullish movement has set in. Dealers find themselves with an ample stock of mill grades on their yards, but the steel plants in this territory are not yet ready to meet the prices asked for material. While confidence still is expressed that mills will be compelled to buy important tonnages, the tone of the market does not reflect the strength which prevailed two weeks ago. Prices are unchanged.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

	Per Gross Ton	
Heavy melting steel	$14.00 to	$14.50
Scrap rails for melting	13.50 to	14.00
Short rails	19.00 to	19.50
Relaying rails	27.00 to	27.50
Rails for rolling	15.00 to	15.50
Old carwheels	13.00 to	13.50
No. 1 locomotive tires	18.00 to	18.50
Railroad malleable	15.50 to	16.00
Agricultural malleable	14.50 to	15.00
Loose sheet clippings	8.50 to	9.00
Champion bundled sheets	10.00 to	10.50
Per Net Ton		
Cast iron borings	7.50 to	8.00
Machine shop turnings	7.00 to	7.50
No. 1 machinery cast	18.00 to	19.00
No. 1 railroad cast	15.00 to	15.50
Iron axles	21.00 to	21.50
No. 1 railroad wrought	10.50 to	11.00
Pipes and flues	9.00 to	9.50
No. 1 busheling	10.50 to	11.00
Mixed busheling	7.00 to	7.50
Burnt cast	8.00 to	8.50
Stove plate	10.50 to	11.00
Brake shoes	11.00 to	11.50

Railroad Equipment

The Chicago Great Western has ordered 300 automobile and 200 box cars from the Pullman Car & Mfg. Co.

The Interstate Oil Shippers' Line is in the market for 40 tank cars.

The Sinclair Refining Co. will take prices on 16 special coke cars.

PERSONAL

Frank L. Gibbons, who has been Cleveland district sales manager of the Central Steel Co., Massillon, Ohio, has been appointed Cleveland district sales manager of the Central Alloy Steel Corporation, formed by the merger of the United Alloy Steel Corporation with the Central company. R. B. Kelly and N. L. Schneider, who have been in charge of the United Alloy sales in Cleveland, the former having handled the alloy steel products and the latter the sheet sales, have been appointed assistant district sales managers under Mr. Gibbons. L. D. Mercer, who was in charge of sheet sales of the United Alloy Corporation, will serve in a similar capacity with the merged company under J. H. Schlendorf, director of sales. The general offices of the United company have been moved to Massillon and merged with the Central offices.

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Milton H. Pettit, for three years vice-president and general manager of manufacturing of the Simmons Co., New York, has resigned, effective Oct. 15, to become vice-president and assistant general manager of the Nash Motors Co., Kenosha, Wis. He was for twenty years vice-president in charge of production of the J. I. Case Threshing Machine Co., Racine, Wis. He is a native of Kenosha, the seat of the original Simmons works. His position in the Nash organization is a newly created one.

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William H. Schulte, for the past six years with the American Foundry Equipment Co., has resigned to become general superintendent of S. Cheney & Son, Manlius, N. Y., gray iron founder. Previous to his connection with the American Foundry Equipment Co. he was foundry superintendent for the Arcade Mfg. Co., Freeport, Ill. For several years Mr. Schulte has been exhibition superintendent of the American Founders' Association.

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G. E. Harcke, director and industrial engineer, Airco Welding Institute of New Jersey, will speak on oxyacetylene before the Worcester, Mass., chaper of the American Society for Steel Treating, Thursday evening, Sept. 9.

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Victor Larson, formerly production manager for the Canadian Ingersoll-Rand Co., Toronto, and more recently managing director of the Sleeper & Akhurst Co., Ltd., Coaticook, Quebec, will be in charge of the new office of Arthur Jackson, Toronto, factory representative for a number of machine tool manufacturers in the United States, which office will be opened on Sept. 15 at 437 Grosvenor Avenue, Westmount, Montreal.

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Deane S. Hazen, recently a management consultant at Springfield, Mass., and for eight years advertising manager and plant reorganization specialist for the National Acme Co., Cleveland, has been appointed assistant sales manager for W. L. Brubaker & Brothers Co., manufacturer of taps, with headquarters at 50 Church Street, New York.

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Farrand Hall, for a number of years Cleveland district sales manager for the Carborundum Co., Niagara Falls, N. Y., maker of abrasive and refractory materials, has been transferred to the sales department in the company's main offices at Niagara Falls. Mr. Hall's position at Cleveland will be filled by Harry Collinson, formerly Milwaukee district sales manager for the company, and he in turn will be succeeded by Carl J. Steuber, formerly special service representative in the Carborundum coated abrasive division.

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Walter M. Flanagan, for eight years steam engineer in the Youngstown district for the Carnegie Steel Co., has been added to the staff of the chief mechanical engineer of the company in Pittsburgh.

F. P. Fairchild, formerly power engineer in charge of design on steam power developments for the Dwight P. Robinson Co., New York, has been appointed engineering manager for the Ladd Water Tube Boiler Co., Pittsburgh. He was graduated from the mechanical engineering department of the University of Kansas in 1910.

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D. F. Edwards, president and a director of the Wickwire Spencer Steel Corporation, New York, has resigned, effective Sept. 1, and has become a member of the research staff of the Graduate School of Business Administration of Harvard University. E. C. Bowers, vice-president in charge of manufacture for the Wickwire company, has been elected to fill Mr. Edwards' position, and will be succeeded by Paul M. Macklin.

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E. Theodore Sproull has been appointed general manager of sales of the Oliver Iron & Steel Corporation, Pittsburgh, succeeding John C. Smith, who retires after 38 years service with the Oliver interests. Mr. Sproull recently resigned as assistant to the president of the Trumbull Steel Co., Warren, Ohio, a position he held after the reorganization. Before that he was general manager of sales. Prior to going with Trumbull, Mr. Sproull was associated with the Jones & Laughlin Steel Corporation, Pittsburgh, but got his early education in the steel industry with the American Sheet & Tin Plate Co.

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Magnus W. Alexander, president of the National Industrial Conference Board, arrived in New York, Sept. 6 on the Albert Ballin.

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William H. Donner, president Donner Steel Co., Buffalo, N. Y., is returning to the United States on the steamship Resolute, scheduled to arrive Sept. 16, after a stay in Europe, chiefly in Germany.

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L. S. Longenecker, 409 Bessemer Building, Pittsburgh, is now the Pittsburgh district representative of the Union Mining Co., Baltimore, in the sale of its refractory brick.

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Walter Graham, New Jersey representative for Henry Prentiss & Co., machine tools, 149 Broadway, New York, has sailed for Europe for a month's vacation.

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M. G. Corson (M. G. Korsunsky), for four years non-ferrous research metallurgist with the Union Carbide & Carbon Research Laboratories, Ltd., Long Island City, N. Y., recently resigned his position and will engage in consultation work in non-ferrous metallurgy. He is a graduate chemical and metallurgical engineer, educated in two polytechnic schools of Europe. His chief duties, while with the Union Carbide & Carbon Co., consisted in exploring new fields of applications for certain products of the Electro Metallurgical Co., namely, chromium, manganese and silicon. In this direction he succeeded in developing a group of copper-base alloys containing silicides of either chromium, iron, cobalt or nickel in amounts of 0.5 to 7.0 per cent, the balance being either copper or a high-copper brass, tin bronze, aluminum bronze or cupronickel. All these alloys are completely parallel to duralumin in their amenability to hardening by heat treatment. Mr. Corson succeeded also in developing a line of high-manganese copper alloys in the wrought form, which not only show high electric resistivity but also strong resistance to the oxidizing types of wet corrosion. When still residing in his native country (Russia), he was active in the development of the copper alloys and in the refining of platinum ores.

The seventh annual outing of the Boston Chapter of the American Society for Steel Treating will take place Saturday, Sept. 11, at the Red Hill Country Club, North Reading, Mass. Guests of honor will be Capt. Giuseppi di Farrari, Milan, Italy, metallurgist working under Doctor Gioletti, and Frederick Hughes, vice-president New Departure Mfg. Co., Bristol, Conn.

OBITUARY

WILLIAM BROWN GLADDING, vice-president and a director of the United Wire Supply Co., New York, for many years a resident of Providence, R. I., died Aug. 31, at the home of his son-in-law, Charles Casey, at Sorrento, Me. He was 71 years of age.

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GEORGE HAMLIN SARGENT, president of Sargent & Co., 223 West Randolph Street, Chicago, dealer in railroad supplies, died Sept. 1 at his home in Evanston. He was 60 years old and formerly lived in Brooklyn.

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SAMUEL H. SQUIER, one of the founders and formerly vice-president of the Milwaukee Electric Crane & Mfg. Co., Milwaukee, died Sept. 1 at his home in Wauwatosa, Wis. He retired about eight months ago.

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HENRY GREVE, president of the John Wahl Commission Co., St. Louis, dealer in prime Western zinc, brass, special zinc and pig lead, died Aug. 31 at his home in that city. His connection since early life with one of the oldest non-ferrous metal houses in the country had made him one of the best known men in the West in the zinc market and among the galvanizers.

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GEORGE A. MCLEAN, until his retirement 20 years ago, a familiar figure in the Pittsburgh iron and steel trade, died at his home near McKean, Erie county, Pa., Sept. 1. He was born in Allegheny, Pa., 69 years ago, and as a young man was identified with the Pennsylvania Tube Co. He left that company to enter the iron and steel scrap business under the firm name of Scott & McLean. After the death of Mr. Scott the firm became the George A. McLean Co. He was one of the founders and for some years president Damascus Bronze Co., Pittsburgh, and for a time was vice-president Allegheny Steel Co., Brackenridge, Pa. He was one of the organizers of the Springs National Bank, Cambridge Springs, Pa., and for several years its president.

GEORGE A. MCLEAN

GERMAN EXPORTS GAIN

Great Strides in First Half Year—Tonnage Above America's 12-Month Total

WASHINGTON, Sept. 7.—Analysis of German exports of iron and steel products made by the iron and steel division of the Department of Commerce here, shows an estimated 50 per cent increase for the current year. Imports show a marked decrease. The Department of Commerce data show that the German exports during the first six months of this year amounted to 2,261,429 metric tons. This six-month total exceeds by 626,754 tons (38 per cent) the total exportation for the year 1924 and is equal to 74 per cent of the 1925 yearly total.

This gain for the six-month period is accounted for chiefly by increases in the shipment of eight classes of products—bar iron, pig iron, rolled and drawn wire, ingots, scrap, tubes and fittings, plates and rails and accessories, which combined total 88 per cent of Germany's total outbound trade.

Large Plants Recovering Strength

This bears out the theory, the Department of Commerce says, that the larger industrial enterprises, i.e., rolling mills, foundries, sheet and pipe mills, etc., are recovering more rapidly than the medium-sized enterprises manufacturing lighter articles. Exports of bridge and other structural work, casks and buoys, cast iron pipe, screws and wire nails contributed lesser quantities to the volume of exports. These were offset to a degree by decreases in the tonnage of railroad axles, malleable castings and some other products, but the increases in pig iron or bar iron would be more than enough to offset them, in turn.

In the opinion of the Department of Commerce, the formation of the new steel trust in Germany has not yet affected Germany's competitive capacity, but the anticipated results should begin to appear during the second half of 1926. It was stated also that the recent negotiation of the European steel syndicate, and the corresponding elimination of price cutting by the Belgian and French industries, should strengthen Germany's position in the important consuming markets of the world.

Many Import Shipments in Bond

In explanation of the German import situation, department experts point out that the import statistics for June reveal that approximately 50 per cent of the imports of ingots, blooms, slabs, billets, etc., were made "in bond"; as this material is being subjected to further manufacturing processes in German rolling mills, and will be re-exported to Great Britain and other prominent markets. Luxemburg is still leading as a supplier of this material to Germany. Growing imports of bar iron into Germany are explained by the increased competitive capacity of the Saar district producers, because of the inflation of the French currency.

Birth Rate and the Labor Market

An unusual method of analysis of the condition of employment, used in Germany in an effort to look ahead to future labor conditions, is reported in "Industrial and Labor Information," issued by the International Labor Office of the League of Nations. Counting on the age for leaving school at 14, "it will not be until 1928 that the first contingents of children born during the war come on the labor market. From 1915 onward the birth rate in Germany suffered from the war, reaching its minimum in 1917, with a reduction of 50 per cent from the 1913 figure. It rose in 1918 and became normal again in 1920. The total diminution in the birth rate for 1915 to 1919 is estimated at 3,300,000. This considerably exceeds the number of Germans killed in the war, estimated at about 2,000,000."

According to figures drawn up by the Federal Statistical Office, taking account of mortality on the 1913 basis, the following numbers will become available for the labor market, beginning in 1928:

1914 class, in 1928	1,293,300
1915 class, in 1929	1,210,528
1916 class, in 1930	793,023
1917 class, in 1931	717,431
1918 class, in 1932	650,903
1919 class, in 1933	636,673
1920 class, in 1934	1,311,475
1921 class, in 1935	1,270,537

It is assumed that on the average 80 per cent of the total number reaching 14 years will enter the labor market. On this basis the annual deficit of new workers in comparison with 1928 will be 80,000 in 1929, 500,000 in 1930, 570,000 in 1931, 640,000 in 1932 and 590,000 in 1933. The total deficit by 1933 will thus exceed 2,000,000.

Another light on the employment situation in Germany is afforded by an article in the *Berliner Tageblatt* of Feb. 21. Before the war Germany had an able-bodied population of 30,000,000 out of a total of 69,000,000. Accounting for territorial losses, the able-bodied population in present area was about 27,250,000. At present, however, in the same area the able-bodied population is about 32,500,000.

British Asked to Join Steel Cartel

Mill Interests Expected to Attend November Meeting in London—Continental Markets Quiet—American Importers Active

(*By Cable*)

LONDON, ENGLAND, Sept. 6.

CLEVELAND pig iron has advanced 6d. per ton, but business is still confined to small quantities from the available stocks. Practically no post-strike orders have been placed as yet. The general outlook, however, is brighter, based on more hopeful coal news.

Steel prices are firm, with consumers paying up to 40s. premium for available supplies. Most makers are well booked and asking about 15s. over the pre-strike prices on tonnages for post-strike delivery. The Clyde shipyards output in August was eight vessels of 32,000 tons.

There is more activity in tin plate, consumers showing increased interest in after-strike shipment, but the volume of sales is restricted as a result of uncertainty of an early termination of the coal stoppage. Tin plate, 20 x 28 in., from stock is commanding 23s. 3d. per base box and 14 x 20 in. plates are bringing 21s. 6d. Sales with October shipment guaranteed are at 21s. 9d., while shipment after settlement of the strike brings about 20s. 3d., all f.o.b. works port.

Galvanized sheets are quiet. There is some Far Eastern inquiry for black sheets, but sales are restricted in other markets.

Continental reports state that prominent British steel interests have recently discussed the question of entry into the Continental Raw Steel Cartel and it is expected that the cartel will issue an invitation in October for British works to attend a conference, probably to be held in London early in November.

Continental steel is firmer, but business is quiet, with semi-finished very scarce. On Aug. 1 there were 152 French furnaces in blast.

FOREIGN STEEL ACTIVE

Several Large Contractors for Reinforcing Bars Accepting Continental Bids—Export Trade Quiet

NEW YORK, Sept. 7.—Continued activity in the demand for foreign steel is reported, although, with a few exceptions, inquiries and purchases are confined to small lots. Reinforcing bar orders are in good volume and a fair business is reported by importers in structural shapes, beams, hoops and small lots of special products. Prices of bars continued at about 1.70c, 1.80c per lb., c.i.f., duty paid, for intermediate grade Thomas steel and 1.95c. per lb. for open-hearth material.

In the Boston district an inquiry for 1000 tons of deformed steel bars has been partly closed with 500 tons awarded to an importer representing a German seller. A contract for 1200 tons of deformed bars in Portland, Me., has been awarded to a local mill, following the consideration of bids submitted on Continental material. The order was booked by Bancroft & Martin Rolling Mills Co., Portland, for delivery part from stock and the price mentioned in connection with the business is about 1.80c per lb., Pittsburgh, slightly higher than the bid for foreign bars. In the New York district, the P. J. Carlin Construction Co., New York, operating on a large sewage contract in Brooklyn, is reported inquiring for 500 tons of reinforcing bars. Foreign bids are being considered on the Lake Pontchartrain bridge at New Orleans, calling for about 10,000 tons of bars. Among other substantial lots is 600 tons of deformed steel bars under inquiry by the Arundel Corporation, Baltimore, contractor on the Susquehanna Power Co. dam at Conowingo, Md.

Export trade is quiet with very little business coming from Japan or China and Cuban business confined to small lots, which, however, represent a rather sizable total. A tonnage of gas pipe, about 162,000 ft., for delivery to Manila, P. I., is reported to have gone to a Continental maker. Japanese purchases of light-gage black sheets have diminished, following the recent buying movement, the present British price evidently proving

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.86 per £ as follows:

Durham coke, f.o.b.	£2	15s.				$13.36		
Bilbao Rubio oret	1	0½				4.97		
Cleveland No. 1 fdy.	4	13				22.60		
Cleveland No. 3 fdy.	4	10½				22.00		
Cleveland No. 4 fdy.	4	9½				21.75		
Cleveland No. 4 forge	4	9				21.63		
Cleveland basic (nom.)	3	15	and	£3	15½s.*	18.23	and	$18.35*
East Coast mixed	4	2½	to	4	3	20.04	to	20.17
East Coast hematite	3	16	to	3	16½	18.46	to	18.58
Ferromanganese	14	0				68.04		
*Ferromanganese	14	0				68.04		
Rails, 60 lb. and up	6	15	to	7	5	32.80	to	35.23
Billets	6	10	to	8	0	31.59	to	38.88
Sheet and tin plate bars, Welsh	6	5				30.37		
Tin plates, base box	1	0¼	to	1	2⅛	4.93	to	5.65
Black sheets, Japanese specifications	13	15	to	13	17½	66.83	to	67.43
						C. per Lb.		
Ship plates	7	10	to	8	0	1.62	to	1.73
Boiler plates	9	10	to	11	0	2.06	to	2.39
Tees	7	15	to	8	5	1.63	to	1.75
Channels	7	0	to	7	10	1.41	to	1.62
Beams	6	15	to	7	5	1.46	to	1.57
Round bars, ¾ to 3 in.	7	12½	to	8	2½	1.65	to	1.76
Steel hoops	10	10	and	11	0*	2.28	and	2.39*
Black sheets, 24 gage	11	5				2.44		
Galv. sheets, 24 gage	16	5	to	16	10	3.52	to	3.58
Cold rolled steel strip, 20 gage	13	0				3.91		

*Export price.
†Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a)								
Belgium	£3	11s.	to	£3	12s.	$17.25	to	$17.50
France	3	11	to	3	12	17.25	to	17.50
Luxemburg	3	11	to	3	12	17.25	to	17.50
Basic pig iron: (a)								
Belgium	3	4	to	3	5	15.55	to	15.80
France	3	4	to	3	5	15.55	to	15.80
Luxemburg	3	4	to	3	5	15.55	to	15.80
Coke	0	18				4.37		
Billets:								
Belgium	4	15	to	4	16	22.68	to	22.82
France	4	15	to	4	16	22.68	to	22.82
Merchant bars:						C. per Lb.		
Belgium	5	1	to	5	2½	1.11	to	1.15
Luxemburg	5	1	to	5	2½	1.11	to	1.15
France	5	1	to	5	2½	1.11	to	1.15
Joists (beams):								
Belgium	4	19	to	5	1	1.09	to	1.11
Luxemburg	4	19	to	5	1	1.09	to	1.11
France	4	19	to	5	1	1.09	to	1.11
Angles:								
Belgium	5	1				1.11		
⅛-in. plates:								
Belgium	6	0	to	6	2½	1.32	to	1.35
Germany	6	0	to	6	2½	1.32	to	1.35
¼-in. ship plates:								
Belgium	5	12½	to	5	15	1.24	to	1.26
Luxemburg	5	12½	to	5	15	1.24	to	1.26
Sheets, heavy:								
Belgium	6	3	to	6	4	1.33	to	1.34
Germany	6	3	to	6	4	1.33	to	1.34

(a) Nominal.

attractive from a speculative standpoint. On lots of 500 tons or more British mills are reported offering as low as $72.25 per ton, c.i.f., this being the reported quotation for Globe or Raven brand, for delivery after the strike. A number of desirable inquiries are reported to be in preparation in Japan, including the 10,000 tons of rails for which the Imperial Government Railways are expected to enter the market before long.

FRENCH EXPORTS GOOD

Internal Conditions Chaotic Because of Exchange—Authorized Pig Iron Production Less

PARIS, FRANCE, Aug. 27.—August has not been active; inland prices are still rather blurred and exceptional. For export, owing to the tacit effort of the future contracting parties of the four-fold steel entente, prices have grown firmer, especially as regards semi-finished products. Costs in industry have not stopped going up, for a new increase of at least 15 per cent on railroad tariffs is feared for Oct. 15.

Coke.—During the first 23 days of August the O. R. C. A. received from the Ruhr 162,269 tons of coke, an average of just over 7000 tons per day. Negotiations between French metallurgists and German coke makers have brought about an agreement regulating the imports of German coke into France. Whether it is a case of indemnity delivery or of shipment in execution of an open-market contract, the price of coke at cokeries will henceforth be the same and will vary according to the importance of the tonnage, also with the rate of exchange. At present, the settled price is 16.80m., to which must be added 10.40m. for freight to Sierck, 8.55 fr. for customs duty and other charges at frontier, and the O. R. C. A. fee for distributing German coke (about 1.50 fr. per ton) or a total of about 241.25 fr., if we take as basis 1m. = 8.50 fr., which means an advance of about 50 fr. on the actual price of indemnity coke.

Pig Iron.—Pig iron producers gathered on Aug. 24 in Paris to examine the situation and to decide upon prices and tonnages for September, taking into account the increases on coke, on railroad tariffs and other factors of cost. Producers of phosphorus pig iron for casting decided to keep the basis price (600 fr.) per ton, ex-works, for September. Foundrymen had relied on a notable reduction, but furnace owners did not have much trouble in demonstrating that the advance on German coke and transport would entail an increase in costs of about 75 fr. per ton of pig iron.

Producers have been authorized by the Office de Statistique des Produits Métallurgiques to engage 40,000 tons over September and to put aside at the same price 10,000 tons in case of emergency. The 50,000 tons for August has nearly all been disposed of during the month.

Phosphorus pig iron producers have also made payment terms milder; henceforth payment is 30 days from end of shipment month, by draft accepted on delivery day (instead of on order day), or else by check on remittance of the order, with a reduction of 1.25 per cent (which means 7.25 fr. allowance per ton).

Hematite pig iron producers have increased the price 15 fr. per ton. The basis price in the Lyons region will thus be, on Sept. 1, 690 fr. for foundry pig iron and 720 fr. for cast iron. This rise is chiefly caused by the advance in coke.

Spiegel prices are not modified, for these products have greatly benefited by the fall of the British currency. They remain at 915 fr. for 10 to 12 per cent Mn. and 1123 fr. for 18 to 20 per cent Mn.

Blast furnaces are authorized to engage 45,000 tons of hematite in September, instead of 50,000 tons, as in August; 35,000 tons in October, and 30,000 tons in November.

We believe that producers have based their calculations on an advance of 60 fr. per ton on German coke delivered at the consuming plants.

Export activity is still satisfactory. The prices of the French-Belgian-Luxemburg entente are not officially changed, but, while last week deals were closed at 580 to 600 fr., this week they approach 600 to 610 fr., the rate of exchange of the Belgian franc not being without influence on this strengthening.

Rolled Iron and Steel.—The tendency is not so quiet as last week, but still far from being active. Revival of business depends upon exchange rates. It is not desired that conditions come back to their normal level, for it would completely stop orders and paralyze the traditional autumnal revival.

Prices vary greatly and are much tampered with. Blooms—when they are really dealt with—are quoted at about 700 fr.; billets in the same way at 750 fr.; largets at 800 to 825 fr. These prices are lower than those for export, f.o.b. Antwerp; blooms being quoted at £4 8s. (making, at 170 fr. per £, 748 fr.); billets, £4 12s. (about 782 fr); largets, £4 19s. (about 840 fr.). This is likely explained by the scarcity of spot material on the inland market.

Per contra, beams, which are sold inland at 850 to 900 fr., are quoted for export at £4 17s. 6d. to £4 18s. 6d.; and bars, instead of approximately 950 to 1000 fr., are quoted, f.o.b. Antwerp, at £5 6s.

Sheets.—On the inland market, a big plant offers to sell heavy sheets (5mm. or No. 6½ gage and over) at 110 to 113 fr. per 100 kg., ex-works. In light sheets a few deals have been closed at about 170 fr. For export competition between the different countries is rife for heavy sheets. Nevertheless, the basis price for 5mm. thickness remains about £5 10s. (at 170 fr. = 935 fr.).

GERMAN TRADE BETTER

Deliveries Slower and Demand Heavy — Many Foreign Orders Coming In

(*By Radiogram*)

BERLIN, GERMANY, Sept. 6.—Recovery in the steel trade, both domestic and export, continues. Steel works have had to lengthen delivery terms to around seven weeks. All rolled goods except thick sheets are in increasing demand; also machine tools, agricultural machinery and automobiles.

The Steel and the Bars syndicates have announced that they will retain August prices unchanged in September. Export prices are rising steadily, as a result of which the Steel Syndicate has reduced its price rebates on materials purchased by German exporting manufacturers.

The Western Steel Works has received large orders from Holland for ship building material and for bars. There is considerable foreign demand for both light and heavy rails. In late August numerous orders were received from Scandinavia, South America and Japan.

Canadian Iron and Steel Production Declines

Canadian production of pig iron totaled only 67,232 tons in July, as compared with 70,854 tons in June, representing a decline of 5 per cent, according to official Canadian figures, states a report to the Department of Commerce from Trade Commissioner Meekins at Ottawa.

The July production of ferroalloys amounted to 2931 tons, a decrease of 26 per cent from the production in June. There was also a decrease of 20 per cent in the Canadian output of steel ingots, which totaled 64,847 tons in July and 81,277 tons in June.

The cumulative production for the first seven months of 1926, however, in totaling 438,096 tons of pig iron and ferroalloys, was 40 per cent higher than that of the similar period in 1925 (311,838 tons). Steel ingots and castings were also higher during the first seven months of 1926 than in 1925—496,031 tons against 446,168 tons, an increase of 11 per cent.

Only five blast furnaces, or 41 per cent of all those in the Dominion, remained in operation on July 31, with a total daily capacity of 2075 tons.

Flue Dust Causes Annual Waste of 75,000 Tons of Alabama Iron Ore

About 75,000 tons of iron ore is lost yearly in the Birmingham district in the form of flue dust escaping from the blast furnaces, states the Bureau of Mines, Department of Commerce, which has conducted a study of the subject. The flue dust losses in this district will average 250 lb. per ton of pig iron produced. On the basis of the present rate of pig-iron production, the annual loss of flue dust exceeds 300,000 tons. The iron content of the dust probably averages 25 per cent, and the loss of iron from this cause thus amounts to about 3 per cent of the iron mined in the district. By the use of magnetic concentrators of various kinds, it is considered that much of this loss can be prevented.

The operators of the district are endeavoring to prevent this waste, and it was at their request that the Bureau of Mines undertook this investigation. A summary of the report says:

"The high content of gangue in the average flue dust of the Birmingham district makes it unfit to treat in the same manner as those of other districts where direct sintering is sufficient to produce a satisfactory product," state Oscar Lee, B. W. Gandrud and F. D. DeVaney, in a report of the investigation, just issued. The charge and the operating conditions at the various furnaces from which samples were obtained are so variable that no single sample of flue dust can be taken as representative. Likewise, samples from the same furnace varied greatly in physical characteristics and in chemical composition. Hence a successful concentration process must be capable of operating under a varying feed.

"The coke [in the flue dust] can readily be removed by gravity concentration, for example hydraulic classification. However, after the coke has been removed the remaining low-grade iron ore is not amenable to satisfactory concentration by ordinary methods. This is due primarily to intimate interlocking which required grinding to 100 mesh to liberate the hematite from the gangue. Material of such fineness is difficult to handle by gravity concentration.

"In a number of the samples hot reducing gases in the blast furnace or in the dust catcher had converted the iron minerals from hematite or limonite into magnetite. When such an alteration has taken place, a good separation of the iron mineral from the gangue can be obtained by use of magnetic concentration machines.

"Magnetic concentrators of various kinds, such as a magnetic wet cobber, a magnetic dry concentrator, and a magnetic log washer, were used on flue dust in which the iron mineral had been converted into magnetite. The first two machines are built to handle coarse material, and the log washer is designed to handle fine material. The results obtained with these different machines show that a good concentrate and a high recovery can be made by the dry concentration or the wet cobber without preliminary crushing. It is doubtful whether the added expense of fine grinding would be justified by the higher grade of concentrate obtainable in the magnetic log washer.

"When a large proportion of iron is in the form of magnetite, a magnetic cobber will give excellent results at a low cost and requires a relatively simple installation."

Copies of Serial 2761, "Magnetic Concentration of Flue Dust of the Birmingham District," containing the detailed results of this investigation, may be obtained from the Bureau of Mines, Department of Commerce, Washington.

St. Louis Stove Manufacturers Merge as $4,000,000 Company

The Buck's Stove & Range Co., capitalized at $1,500,000, and the Bridge & Beach Mfg. Co., at $1,000,000, St. Louis stove manufacturers, have been consolidated, the new company to be known as the St. Louis Range & Furnace Co., with combined assets of $4,000,000. The capital stock of the company will be $1,600,000, consisting of 11,000 shares of 6 per cent cumulative preferred stock, par value $100, and 20,000 shares of common stock, par value $25.

The Bridge & Beach plant will be used for manufacturing, and the plant and property of the Buck's Stove & Range Co. will be sold as early as possible and the proceeds used for capital.

The Bridge & Beach company was established in 1837 by Hudson E. Bridge, Sr., and Buck's was founded in 1846 by Charles Buck and Wiley Wright. Lee W. Van Cleave, president of Buck's since 1915, will be president of the St. Louis Range & Furnace Co., and L. H. Booch, president of Bridge & Beach, will be vice-president. The other officers are: Vice-presidents, Jones T. Templeton, former vice-president of Buck's, and G. L. Bridge, former vice-president of Bridge & Beach; treasurer, Maurice A. Murray, former treasurer of Buck's; secretary, Louis H. Riecke, former president of Bridge & Beach.

Active Operations at Youngstown

YOUNGSTOWN, Sept. 7.—The Youngstown Sheet & Tube Co. has blown in No. 1 blast furnace in its group at Hubbard, Trumbull county, Ohio, giving it seven active stacks of nine in the Youngstown district, and increasing the district total to 28 furnaces active of a total of 42.

For the most part, shipments last month by Mahoning Valley independent producers established new August records, and makers entered September with well-filled order books. Steel pipe producers have backlogs in both lapweld and buttweld sizes, and despite the fact that this is usually the slack season for standard tubes, demand for the smaller sized pipe is such that such capacity is being operated at a high rate. Sheet makers are booked ahead 30 days and longer.

In semi-finished steel, it has been largely the adherence of makers to a firm price policy, marked by little or no deviation, which has supported the price structure in the various grades of steel sheets. Considerable pressure was brought to bear on makers during the summer to dislodge the price of $36, Pittsburgh or Youngstown, on sheet bars, especially by non-integrated rollers. The fruits of a firm policy are now being reaped in a strong finished market.

Officials of the Youngstown Sheet & Tube Co. expressed considerable gratification over the favorable response accorded the new sheet pricing practice, establishing No. 24 gage as the base and revising the differentials. Information reaching the company is that makers controlling most of the production throughout the country have adopted the new plan. The company feels its effects will be stabilizing and beneficial to both seller and buyer. The new schedule permits a profit on the lighter gages, which some sheet producers felt had been manufactured without a fair profit under certain conditions. At the same time, the heavier gages are subject to reductions, so that the change is regarded more as a readjustment. For more than a year, Frank Purnell, assistant president of the company, has been engaged in the work of revision.

All rolling mill operations were suspended over Labor Day, but by-product coke ovens and blast furnaces continued in action without interruption.

Foundry Instructors to Meet

Instructors of foundry practice in technical schools have been invited to meet at a dinner gathering Tuesday evening, Sept. 28, during the convention of the American Foundrymen's Association in Detroit. Following the dinner, foundry instruction in schools will be discussed. Four papers outlining the purposes and methods of instruction at Carnegie Institute of Technology, the University of Michigan, Purdue University and the University of Illinois will be presented at this time.

Machinery Markets and News of the Works

TRADE IS HOPEFUL

Machine Tool Business Expected to Show Fall Improvement

Manufacturer of Screw Machines Books Order for 60—Turret Lathe Company Sells 16

ALTHOUGH August buying of machine tools was not up to expectations, the builders consider the outlook encouraging for the fall. Some buyers whose requirements are known are waiting until they have inspected machines at the National Steel and Machine Tool Exposition in Chicago, Sept. 20-24, before placing orders.

Recent advances in prices of screw machines and turret lathes have brought in quite a bit of business on which quotations had been made prior to the advances. A Cleveland company booked an order for 60 screw machines, making a total of 150 it has sold within 30 days, and a turret lathe manufacturer in Cleveland last week sold 16 machines to one company.

The Delco Light Co., Dayton, Ohio, has purchased nine automatic lathes from an Eastern company, a pattern works in Detroit bought four profiling machines and a Detroit automobile company bought three deep-hole drilling machines.

Railroad inquiry is fairly promising, small inquiries enanating from a number of roads. The New York Central continues to ask prices on machines for various shops.

The Carnegie Steel Co. will buy equipment for fabricating steel at its new warehouse at Houston, Tex.

New York

NEW YORK, Sept. 7.

THE past week has produced a rather small volume of machine tool orders in this district, but there is a fair amount of inquiry, particularly from railroads, and expectations are that the remainder of this month will see a steadily increasing demand for tools. The New York Central continues to send out inquiries for equipment for various shops. An Eastern company has received an order for nine automatic lathes from the Delco Light Co., Dayton, Ohio; a Detroit automobile company has bought three deep-hole drilling machines, and a Detroit pattern works four profiling machines. Other purchases include a 72-in. boring, drilling and milling machine by a Cleveland company; a vertical shaper by a shipyard at Quincy, Mass.; a vertical shaper by a Cleveland manufacturer; a jig borer by a tool company in Columbus, Ohio; also one to Toledo, Ohio, company; a die sinking machine to a tool company in Detroit; a 16-in. geared-head lathe to the Bethlehem Steel Corporation's plant at Johnstown, Pa.

David H. Smiths & Sons, Inc., Brooklyn, has sold an Amplex No. 90 C triple combination punch, plate shear, bar tee and angle cutter to the Aluminum Co. of Canada, Ltd.; also an Amplex No. 91 quadruple combination punch, shear, bar tee and angle cutter, with notching attachment, to the Up-Town Iron Works, Newark, N. J. It shipped last week to the Brooklyn City Railroad Co., Fifty-second Street shop, Brooklyn, a No. 90 C steel plate frame combination punch, shear, bar tee and angle cutter.

The Frank A. D'Andrea Radio Corporation, Bronx, New York, has leased property at 1503 Inwood Avenue, totaling about 10,000 sq. ft. of floor space, for a new plant.

The New York Central Railroad Co., C. S. White, room 344, 466 Lexington Avenue, New York, purchasing agent, is asking bids until Sept. 16 for requirements of fence wire, barb wire, etc., serial contract No. 22-1926; until Sept. 24 for synchronous converters, air blast transformers and auxiliary equipment, serial contract No. 20-1926.

The Board of Education, Newburgh, N. Y., plans the installation of manual training equipment in its proposed three-story high school to cost $700,000, for which a general contract has just been let to the Zube Construction Co., 1133 Broadway, New York. A. F. Gilbert, 358 Fifth Avenue, New York, is architect.

The Manhattan Electrical Supply Co., 17 Park Place, New York, has concluded negotiations for the purchase of E. D. Anderson, Inc., Grand Central Terminal, manufacturer of automatic packing machinery, and will continue operation as a subsidiary, with E. D. Anderson, founder and president, continuing as head.

The Metropolitan Resources, 111 Broadway, New York, has plans for a steam power house at Middle Village, L. I., to cost about $240,000 with equipment. Lockwood, Greene & Co., 100 East Forty-second Street, New York, are architects and engineers. A. M. Dempsey is president.

Charles Proescher, Inc., 84 Eighth Street, Long Island City, operating a sheet metal works, has awarded a general contract to Burmeister & Christensen, Inc., Woodhaven, L. I., for a two-story addition, 50 x 120 ft., to cost $50,000. E. W. B. Aeben, 8335 Eighty-eighth Street, Woodhaven, is architect. Charles Proescher is president.

The Staten Island Edison Corporation, St. George, S. I., has arranged for an increase in capital from 120,000 to 200,000 shares of stock, no par value, a portion of the proceeds to be used for expansion in electric light and power plants and system.

The Board of Education, Walden, N. Y., contemplates the installation of manual training equipment in a proposed two-story high and grade school to cost $200,000. Gerald Betz, 286 Wall Street, Kingston, N. Y., is architect.

Durant Motors, Inc., 250 West Fifty-seventh Street, New York, has completed plans for the manufacture of the Flint automobile at its Elizabeth, N. J. works, heretofore given over exclusively to the manufacture of Star cars. It is purposed to develop an initial output of about 10 Flint cars per day and to increase production after a few weeks. A portion of the works will also be given over to the assembling of Star motor trucks of 1-ton capacity. Charles P. McCarthy is superintendent at the plant.

The Jordan Coal Tar Products Co., Matawan, N. J., will rebuild the machine shop, boiler house and other portions of its plant destroyed by fire Aug. 24, with loss reported at $45,000.

The Liberty Cut Glass Works, Egg Harbor City, N. J., will soon take bids for the construction of a new one and two-story plant, 135 x 150 ft., to cost close to $75,000, to replace its factory recently destroyed by fire. E. Meitzer is general manager.

Fire, Aug. 29, destroyed the lumber and wood-working plant of the Edward G. Miller Mill & Lumber Co., Broad Street, Paulsboro, N. J., with loss in excess of $200,000 including equipment. Plans for rebuilding are under consideration. Edward G. and Paul Miller head the company.

The Sipp Machine Co., Keene Street, Paterson, N. J., manufacturer of textile machinery, etc., has asked bids on a general contract for a one-story addition, 40 x 60 ft., to

cost approximately $20,000. A. E. Sleight, 136 Washington Street, is architect.

The Buk-Kol Engineering Co., 405 Lexington Avenue, New York, has been organized by P. H. Mulvihill, former president of the Economy Grate & Equipment Co., New York, and E. C. Hunter, former manager of the Meriden, Conn., factory of the Bassick Co. It will market a patented grate for burning buckwheat coal in domestic size boilers. For the present the company will have its manufacturing done on contract, but later may have its own plant.

The Leslie Co., Lyndhurst, N. J., which has been owned and operated for about 20 years by J. S. Leslie and associates, has been purchased by a new company headed by S. Inglis Leslie, as president. The business will be conducted without change in the manufacture of Leslie pressure regulators and reducing valves. J. J. Cizek, who was connected with the old company for 20 years, is vice-president; J. M. Naab is secretary and treasurer. The board of directors includes William L. Allison, senior vice-president American Arch Co.; F. A. Schaff, vice-president Superheater Co., and Fredric E. Schluter, president Schluter & Co., investment bankers.

The Parrot Speed Fastener Corporation, 388 Broadway, New York, recently incorporated, will manufacture a stapling machine for office and factory use.

New England

BOSTON, Sept. 6.

WITH most New England machine tool dealers August was a rather lean month and September is starting off slowly. Some tool builders in this territory are busy on orders booked in the Middle West, but few plants are operating anywhere near capacity. Deliveries on certain tools, particularly those made in the Middle West are backward. The most conspicuous instance concerns radial drills, orders booked last January not having been shipped, and unless deliveries are made in the near future there may be cancellations. Sales reported by local dealers the past week were few. The city of Boston closed bids on a small number of lathes for an East Boston school, but it will be about two weeks before awards are made. New tools sold include a 12-in. vertical shaper to a Massachusetts shop. Inquiries are scarce, but the trade is working on a fairly large number of old inquiries which will, it is expected, be closed this month.

The Allen Pope Co., Washington, has been awarded contract to construct a circulating loop for handling materials at the Boston Navy Yard, to cost $155,000.

The Arlington Gas Light Co., 77 Franklin Street, Boston, is taking bids on a one-story 65 x 100 ft. boiler plant at Arlington, Mass., to cost with equipment $75,000. H. L. Ogden is purchasing agent.

The R. D. Kimball Co., 6 Beacon Street, Boston, engineer, is taking bids for a proposed three-story, 82 x 211 ft. and 69 x 87 ft. junior high school at Leominster, Mass., to cost with equipment $500,000. It will contain a manual training department.

The Miller Brothers Pen Co., Meriden, Conn., has incorporated under the laws of that State to manufacture general merchandise, especially pens, pen holders and erasers. Amos S. Van Hise, New York, and H. A. Stevens and H. S. Bradford, Meriden, Conn., are back of the company. The company recently bought at public auction the machinery and merchandise of the pen, penholder and eraser business formerly conducted by the Miller Brothers Cutlery Co., Meriden, and has leased a part of that company's plant. Only a small amount of new equipment is required.

The Staples Coal Co., Davol Street, Fall River, Mass., has filed plans for a one-story repair shop, 40 x 100 ft., to cost about $18,000.

Stebbins & Watkins, 164 Federal Street, Boston, architects, have plans under way for a two-story service, repair and garage building, 100 x 125 ft., at Somerville, Mass., to cost about $120,000 with equipment.

The Board of Education, Tilton, N. H., has plans for a new central power house for service at local schools. Hutchins & French, 11 Beacon Street, Boston, are architects. It will cost about $45,000.

The New York, New Haven & Hartford Railroad Co., New Haven, Conn., has filed plans for an addition to the car repair shops at its Lamberton Street yard, to cost about $32,000.

Following a recent reorganization, the New Haven Air Terminal Corporation, New Haven, Conn., is planning the removal of its plant on Alabama Avenue, including hangar, repair shops, etc., to a new waterfront location, where operations will be concentrated on seaplanes. Lieut. John H. Tweed is president.

The Germania Mills, Holyoke, Mass., have plans for a new power house for service at its textile mills, installation to include two 600-hp. boilers, stokers and auxiliary equipment. The plant will cost about $65,000. McClintock & Craig, 458 Bridge Street, Springfield, Mass., are engineers.

Philadelphia

PHILADELPHIA, Sept. 6.

BIDS are being asked by the Department of City Transit, 1211 Chestnut Street, Philadelphia, until Sept. 16, for three one and two-story machine shops at the Fern Rock Terminal Yards, 360 x 380 ft.

The Philadelphia Gear Works, Richmond and Tioga Streets, Philadelphia, will ask bids about the middle of the month on a general contract for a two-story addition, to cost in excess of $150,000 with equipment. Horace W. Castor, Stephen Girard Building, is architect. Russell C. Ball is president and treasurer.

The L. H. Gilmer Co., Cottman and Keystone Streets, Philadelphia, manufacturer of mechanical belting, etc., has closed negotiations with the Chamber of Commerce, Shreveport, La., for the erection of a new plant at that place, to cost close to $300,000 with machinery. It is proposed to have the initial unit ready for service early next year. The present plant will be continued at Philadelphia.

The Wiedemann Machine Co., 1815 Sedgley Street, Philadelphia, has awarded a general contract to Paul Bross, 2515 West Huntington Street, for a one-story addition.

The Philips Pressed Steel Pulley Works, Inc., 445 East High Street, Philadelphia, has leased the building at 2725 Salmon Street for expansion.

The Edward G. Budd Mfg. Co., Twenty-fifth Street and Hunting Park Avenue, Philadelphia, manufacturer of steel automobile bodies, has awarded a general contract to the Wark Co., 1600 Walnut Street, for its five-story addition at Hunting Park Avenue and Stokley Street, to cost close to $1,000,000 with equipment.

A. F. Amodio, Commerce Building, Atlantic City, N. J., architect, is preparing plans for a six-story automobile service, repair and garage building, 100 x 100 ft., at Massachusetts and Pacific Avenues, to cost $250,000 with equipment.

The American Brown Boveri Electric Corporation, Camden, N. J., operating at the former local plant of the New York Shipbuilding Co., is planning for extensions in the present works and will use the south yard on the Gloucester side of Newton Creek, heretofore inactive, for this purpose. It is understood that a considerable portion of the expansion will be devoted to the manufacture of electric generating units, for which the company has booked heavy orders. Headquarters are at 165 Broadway.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, has asked bids on a general contract for a new two-story tank and plate shop at Altoona, Pa., to be 32 x 175 ft., to cost more than $75,000 with equipment. W. H. Cookman is company architect.

Property of the Steam Vehicle Corporation of America, Allentown, Pa., manufacturer of the Stanley steam car, bankrupt, will be sold on the premises Sept. 14, including machinery and tools, parts, service rights, etc.

The Standard Iron & Steel Co., Harrisburg, Pa., recently formed by Myer Gross, 722 North Sixth Street, and associates, will operate a local scrap yard.

Buffalo

BUFFALO, SEPT. 6.

CONTRACT has been let by the Rand Kardex Bureau, Inc., North Tonawanda, N. Y., to R. R. Kitchen, Inc., Wheeling, W. Va., for a four-story addition, 50 x 188 ft., to the plant of its subsidiary, the Safe Cabinet Co., Marietta, Ohio, manufacturer of metal filing equipment, safes, etc., to cost $165,000. Schenck & Williams, Third National Bank Building, Dayton, Ohio, are architects.

The Nash-Buffalo Corporation, 25 East Jewett Avenue, Buffalo, local representative for the Nash automobile, is completing plans for a five-story service, repair and garage building, to cost $120,000 with equipment.

The Genesee Valley Gas Co., Mount Morris, N. Y., is concluding negotiations for the purchase of the Pavilion Natural Gas Co., Pavilion, N. Y., and proposes to construct a new artificial gas manufacturing plant at the last noted place, to cost $100,000 with machinery. The

purchasing company was organized recently; R. C. Burdick is engineer.

Bids will soon be asked by Walker S. Lee, Jr., Powers Building, Rochester, architect, for a four-story automobile service, repair and garage building, 37 x 160 ft., to cost $165,000 with equipment.

The Stromberg-Carlson Telephone Mfg. Co., 1060 University Avenue, Rochester, is having plans drawn for two new plant units, each one-story, about 160 x 450 ft., to cost in excess of $500,000 with machinery. J. Foster Warner, Granite Building, is architect.

Detroit

DETROIT, Sept. 6.

CONTRACT has been awarded by the Richard Brothers Die Works, Inc., 1560 East Milwaukee Avenue, Detroit, to Frank L. Shoemaker, Sturgis, Mich., for a new one-story plant, 35 x 90 ft., at Hillsdale, Mich., to cost about $65,000 with equipment. Otis K. Richard is one of the heads of the company

The Hillsdale Screen Co., Hillsdale, Mich., has awarded a general contract to the David Little Construction Co., Kalamazoo, Mich., for a one-story addition, to cost about $21,000.

The Lincoln Forging Co., 622 St. Antoine Street, Detroit, is considering the erection of a two-story addition, 60 x 100 ft., to cost about $80,000 with equipment. J. G. Foyer is secretary.

The Cogsdill Mfg. Co., 6511-15 Epworth Boulevard, Detroit, manufacturer of metal cutting tools, etc., has begun the erection of a one-story addition, 35 x 140 ft., to cost about $45,000. S. A. Cogsdill is president.

The Triangle Tool & Pattern Co., 207 Brady Avenue, Detroit, has awarded a general contract to F. M. Stokes, 6432 Northfield Avenue, for its one and two-story plant 50 x 100 ft., to cost about $40,000. T. H. Barkley is head.

The Automatic Products Corporation, 1145 West Grand Boulevard, Detroit, will proceed with the erection of a one-story addition, 120 x 150 ft., to cost about $75,000, for which a general contract recently was let to the C. O. Barton Co., 2100 Washington Boulevard.

The Bates Valve Bag Co., 8240 South Chicago Avenue, Chicago, has plans for a branch factory at Menominee, Mich., one-story, 80 x 240 ft., to cost close to $80,000 with equipment.

The Board of Education, Sault Ste. Marie, Mich., is having plans prepared for a manual training building at the local high school, to cost about $50,000 with equipment. John D. Chubb, Jr., 109 North Dearborn Street, Chicago, is architect.

The Watervliet Paper Co., Watervliet, Mich., has authorized an addition to its power house, to include the installation of a 2000 hp. turbine engine, boilers and auxiliary equipment.

Cincinnati

CINCINNATI, Sept. 6.

MACHINE tool sales reached a low point the past week. The slump is attributed to the absence of executives on vacations and to the desire of many industrial buyers to inspect the tools on exhibit at the National Steel & Machine Tool Exposition in Chicago before actually closing for new equipment. The increased number of inquiries, especially those from the automotive industry, is encouraging. With few exceptions recent orders have called for single machines. Many local builders are preparing to show their machine tools at Chicago, and several will disclose newly-designed machines for the first time.

The Toledo Machine & Tool Co., Toledo, Ohio, has purchased a horizontal boring machine and a manufacturer in the Pittsburgh district has bought a horizontal drill. A Milwaukee company has contracted for a radial drill. A local turret lathe builder has received orders for a liberal number of machines.

The Miami Engineering Co., Middletown, Ohio, recently organized with capital stock of 500 shares of no par value, has engaged in the manufacture of automatic machinery for fabricating paper sacks. It will also build small printing presses. The plant has been equipped with machinery and production has started.

The Record Garage Co., Third Avenue, near Vine Street, Cincinnati, has plans for a six-story and basement service, repair and garage building, 92 x 165 ft., to cost $335,000 with equipment. Hannaford & Son, Dixie Terminal Building, are architects.

The Higgin Mfg. Co., Newport, Ky., manufacturer of hardware and kindred specialties, has plans for a three-story addition, 31 x 38 ft., and will begin work soon. L. H. Wilson, 10 West Fourth Street, is architect.

The Choctaw Culvert Mfg. Co., Randolph Building, Memphis, Tenn., has leased a one-story building to be erected on South Second Street, 55 x 112 ft., for a new plant to manufacture metal culverts, etc. W. C. Lester, Dermon Building is architect.

The Board of Education, 270 East State Street, Columbus, Ohio, is considering the installation of manual training equipment in the proposed three-story and basement McKinley junior high school, estimated to cost $400,000. Howard, Dwight & Smith, 270 East State Street, Columbus, are architects.

The Chevrolet Motor Co., Norwood, Cincinnati, has taken out a permit for its plant addition to cost $230,000 with equipment. A general contract recently was let to Max Penker & Sons, Cincinnati.

The Board of Education, Knoxville, Tenn., is said to be planning the installation of manual training equipment in its proposed two-story and basement junior high school in the Park City district to cost about $200,000, for which bids have been asked on a general contract. Baumann & Baumann, 813 Market Street, are architects.

Pittsburgh

PITTSBURGH, Sept. 6.

A GOOD deal of attention is directed toward the machine tool requirements of the Carnegie Steel Co. for its new warehouse at Houston, Tex., as well as for its machine shop at Clairton, Pa. These needs constitute the most promising sizable business in sight. Orders the past week and for the past month have been surprisingly good for this time of year and with some dealers August was one of the best months this year. Comparison is favorable with the same period last year when business was not particularly brisk.

The Pressed Steel Car Co., Farmers' Bank Building, Pittsburgh, has plans for a one-story forge shop at its McKees Rocks works.

The Moore Metal Mfg. Co., Huff Avenue, South Greensburg, Pa., has awarded a general contract to B. R. Fulmer, 534 North Main Street, Greensburg, for a new one-story plant, 100 x 200 ft., to cost about $75,000 with equipment.

The Kingston Pocahontas Coal Co., Welch, W. Va., has plans for the construction of a new steel tipple at Exeter, W. Va., to cost more than $75,000 with machinery.

The Stove & Range Co. of Pittsburgh, Preble Street, is arranging for the early resumption of operations at its foundry at New Castle, Pa., closed since last April.

The Penn Central Light & Power Co., Union Avenue, Altoona, Pa., has plans under way for a new gas generating plant near Lewistown, Pa., to cost $150,000 with machinery. J. H. Shearer is general manager.

The Standard Steel Specialty Co., Beaver Falls, Pa., has plans for a one-story addition, 87 x 120 ft., to cost close to $50,000 with equipment.

St. Louis

ST. LOUIS, SEPT. 6.

THE Kansas City Southern Railway is in the market for a 24-in. shaper and an 18-in. lathe.

The Wabash Railway has inquired for prices on a 24-in. slotter and a motor-driven floor grinder, with capacity to carry two 16-in. wheels.

The St. Louis Board of Education wants seven 12-in wood turning lathes for a negro high school.

Contract has been let by the W. A. H. Thompson Hardware Co., Topeka, Kan., for a three-story and basement addition, 100 x 150 ft., to cost $150,000. T. W. Williamson & Co., Central National Bank Building, are architects.

The Pocassett Grain & Elevator Co., Baird, Okla., has plans for a new cotton compressing plant to cost about $70,000.

The Dierks & Son Lumber Co., Nineteenth and Woodland Streets, Kansas City, Mo., has plans for a new power house to cost close to $45,000 with equipment. The Henrici-Lowry Engineering Co., Security Building, is engineer.

The Mid-West Show Case Co., 1301 Independence Avenue, Kansas City, Mo., is contemplating rebuilding the portion of its plant destroyed by fire, Aug. 25, with loss reported at $35,000 including equipment.

The Red Seal Refining Corporation, 1030 South Robinson Street, Oklahoma City, Okla., recently reorganized, has plans under way for new works for gasoline production, estimated to cost $125,000 with equipment.

The Moon Motor Car Co., 4400 North Main Street, St. Louis, has leased additional space for extensions. It is planning to establish a body manufacturing division for the production of closed bodies for a new light six-cylinder model. Stewart MacDonald is president.

The Hughes Tool Co., 12-20 West Twentieth Street, Oklahoma City, Okla., has begun the erection of a one-story addition, 40 x 100 ft., for which a contract recently was awarded to the Charles M. Dunning Construction Co. It will be equipped primarily as a welding works.

The Carter Oil Co., Chickasha, Okla., plans the construction of a pumping plant in connection with a new water system for its properties. The entire project will cost about $150,000.

A. J. Reinhart, Tradesmen's National Bank Building, Oklahoma City, Okla., and associates have preliminary plans for a seven-story automobile service, repair and garage building, 50 x 140 ft., estimated to cost $150,000 with equipment.

South Atlantic States

BALTIMORE, Sept. 6.

PROPERTY at Newport, Pa., approximating 28 acres, has been acquired by the Maryland Pipe & Supply Co., Hagerstown, Md., for the establishment of a new plant. Present structures will be remodeled.

The Twin City Power Co., Augusta, Ga., has obtained a permit for the construction of a hydroelectric generating station at Price's Island, McCormick County, S. C., on the Savannah River. The plant will have an initial capacity of 65,000 hp., and is reported to cost in excess of $350,000 with transmission system. A power dam 70 ft. high will be built.

The Washington Suburban Sanitary Commission, 1420 New York Avenue, N. W., Washington, T. Howard Duckett, president, has plans for the installation of a pumping plant in connection with a filtration station near Burnt Mills, Md. The entire project will cost about $300,000. R. B. Morse, Hyattstown, Md., is engineer.

The Atlantic Coast Line Railway Co., Wilmington, N. C., is said to be planning enlargements in its repair shops at Thomasville, Ga. J. E. Willoughby is chief engineer.

The Board of District Commissioners, District Building, Washington, is asking bids until Sept. 16 for four 22-hp. gasoline motors.

The Long Lumber Co., Fruitland, Md., has inquiries out for two stationary steam engines, about 35 to 45 hp. each.

The Bethlehem Shipbuilding Corporation, Baltimore, is said to have plans under way for the initial buildings for its yard extensions on the Key Highway. The entire plant is reported to cost about $1,000,000. J. M. Willis is general manager.

The Georgia Portland Cement Co., Augusta, Ga., lately organized with a capital of $3,000,000 by J. L. Hankinson, 856 Georgia Avenue, Augusta, and associates, has purchased property near Sandersville, Ga., and plans the early construction of a new mill, reported to cost more than $1,750,000 with machinery. Mr. Hankinson now operates a brick-manufacturing plant at Augusta, and will be president of the new organization. J. C. McAuliffe is secretary.

The Craig Furniture Co., Martinsville, Va., recently organized by George D. and W. J. Craig, both of Martinsville, has purchased about 15 acres and plans the early construction of a new plant, to cost about $150,000 with machinery. A power house will be built. The company will operate with a capital of $700,000.

The Eastern Shore Gas & Electric Co., Salisbury, Md., is said to be arranging an expansion program to cost close to $2,000,000. The work will include the construction of a new steam-operated electric generating plant in the Del-Mar-Va Peninsula section. A transmission line will also be built.

The Great Valley Anthracite Corporation, McCoy, Va., contemplates extensions in its coal mines and will install considerable additional equipment, including tipple apparatus. E. C. Searles is president.

The Dixie Machine Co., Hagerstown, Md., announces that, while it has leased the plant formerly occupied by the Moore Engineering Co., that city, it has not taken over any of the assets or liabilities of the Moore company. The Moore Engineering Co. may be liquidated.

Cleveland

CLEVELAND, Sept. 6.

BUSINESS with some of the manufacturers shows considerable improvement, due largely to orders from the automotive industry. A local manufacturer of automatic screw machines during the week booked an order for 60 machines and in the past 30 days has sold 150 machines, practically all to the automobile and accessory manufacturers.

A Cleveland manufacturer of turret lathes booked an order for 16 machines the past week. This company's busines in August was the best of any month this year. This gain, however, is attributed partly to the price advance placed in effect Sept. 1.

Some new demand for boring mills, lathes and planers is coming from tool shops in Detroit which handle work for automobile companies. The Cleveland Planer Co. during the week sold an openside planer to one of these shops.

The Board of Education, Berea, Ohio, has taken bids for the following metal and wood-working machines:

One 12-in. speed lathe with 48-in. bed.
Four 12-in. speed lathes with 60-in. bed
One 16-in. jointer
One 30-in. surfacer
One bench saw with 36 x 44-in. table
One 30-in. band saw

The Central Brass Mfg. Co. and the Paragon Brass Mfg. Co., Cleveland, manufacturers of plumbers' brass goods, have been merged under the name of the former company. The Central plant at 2950 East Fifty-fifth Street is being enlarged to take care of the manufacture of products formerly made by the Paragon company. E. A. Eckhouse, president of the Central company, is at the head of the combined organizations.

The Board of Trade, Elyria, Ohio, is having plans prepared for a $40,000 factory building. R. S. Silsbee, Elyria Savings and Trust Building, is the architect.

J. C. Heintz, 1319 Main Avenue, Cleveland, has awarded contract for a one-story, 48 x 66 ft., machine shop, at 3738 West 143rd Street.

The Fairport and Painesville Eastern Railway Co., Painesville, Ohio, has had plans prepared by R. E. Sheal, engineer and architect, Union Trust Building, Cleveland, for a one-story machine shop, 90 x 180 ft., and roundhouse. Some machinery equipment will be required.

The Shelby Cabinet Mfg. Co., Shelby, Ohio, a new company incorporated for $50,000, will manufacture store, bank and office fixtures.

Gulf States

BIRMINGHAM, Sept. 6.

PLANS are under consideration by the Victory Oil Co., 736 Perdido Street, New Orleans, for a new refinery on site recently acquired, to cost $125,000 with equipment.

The Texas Central Power & Light Co., Frost Building, San Antonio, Tex., has plans for a new steam-operated electric power house in the vicinity of Crystal City, Tex., to cost about $50,000.

The Gulf Refining Co., Port Arthur, Tex., is considering plans for enlargements in its oil refinery, including the installation of high pressure stills and auxiliary equipment. Headquarters are in the Frick Annex, Pittsburgh.

Fire, August 23, destroyed a portion of the band mill of the Mark H. Brown Lumber Co., Lake Providence, La., with loss reported at close to $200,000 including equipment. It is planned to rebuild.

The Town Council, Crystal River, Fla., is asking bids until Sept. 15, for two centrifugal pumping units for a proposed municipal waterworks, a 75,000-gal. elevated steel tank on tower, and pumping units for three sewage pumping stations. E. V. Camp & Associates, Inc., Bartow and Jacksonville, Fla., is engineer. Horace N. Blanton is manager and clerk.

The Texas & Pacific Railroad Co., Dallas, Tex., has plans for an addition to its shops at Marshall, Tex., for valve and valve-motion construction and repair, to cost about $20,000 with equipment. E. F. Mitchell is chief engineer.

The Moore Pipe & Sprinkler Co., P. O. Box 1117, Jacksonville, Fla., has acquired property at State and Blanche Streets and will establish a new plant for the manufacture of sprinkler systems and equipment. Later it is purposed to construct a new plant, about 120 x 300 ft., to cost approximately $75,000.

The Crane Market

INFLUENCED by the approach of Labor Day, the market on electric overhead and locomotive cranes has been quieter than for some time. Few new inquiries have appeared and prospective business is being held over until next week. The New York Central railroad has issued an inquiry for another 20-ton locomotive crane bringing the total list to four 20-ton cranes and one crawl-tread. Business pending includes the overhead cranes for the American Sugar Refining Co., Brooklyn, N. Y., the Boston & Maine Railroad and the two 4-ton electric monorail hoists for the New York Edison Co.

The Stupp Brothers Iron Co., St. Louis, is in the market for a 15-ton, 75-ft. span overhead traveling crane.

Among recent purchases are:

Franklin Lumber Co., Newark, N. J., a 20-ton locomotive crane from the Browning Crane Co.

Arundel Corporation, Baltimore, Md., two 20-ton locomotive cranes, reported purchased from the Industrial Works.

Lucien Dussault, Quebec, a 15-ton used Brownhoist locomotive crane from E. P. Galer, 1060 Anderson Avenue, New York.

West Penn Cement Co., Butler, Pa., three 5-ton electric traveling cranes from the Northern Engineering Works.

Virginian Railway, Princeton, W. Va., a 15-ton yard crane with 2-ton auxiliary from the Northern Engineering Works.

J. E. Moss Iron Works, Wheeling, W. Va., a 10-ton trolley from the Northern Engineering Works.

Basic Products Co., Kenova, W. Va., a 5-ton, 80-ft. span bucket handling crane from the Cleveland Crane & Engineering Co.

Central Alloy Steel Corporation, Massillon, Ohio, a 5-ton, 75-ft. span soaking pit crane from the Morgan Engineering Co.

Bethlehem Steel Co., Sparrows Point, Md., four 10-ton, 106-ft. span cranes from the Morgan Engineering Co.

Illinois Steel Co., South Chicago, a 150-ton ladle crane from the Morgan Engineering Co.

The Columbia Refining Co., Inc., Bourbon and Marigny Streets, New Orleans, is planning to purchase disk pump units with 4-in. suction and 3-in. discharge.

The Board of Education, Olney, Tex., is considering the installation of manual training equipment in its proposed three-story high school to cost $150,000. Voelcker & Dixon, Kahn Building, Wichita Falls, Tex., are architects.

The Mississippi Power Co., Gulfport, Miss., is planning extensions in its steam-operated electric power house and the installation of additional equipment. A number of automatic power substations will be constructed at coast points and extensions made in transmission system. Barney E. Eaton is president.

The M & H Valve & Fittings Co., organized a year ago with capitalization of $300,000 to manufacture steam and water valves as well as general line of flange fittings and flanges, will start up their plant at Anniston, Ala., Oct. 1. J. W. Conway, Atlanta, is president and general sales manager, Whitfield Clark, Anniston, vice-president and L. C. Watson, secretary-treasurer. J. Frank Pettus, heretofore with the Stockham Pipe & Fittings Co., Birmingham, is superintendent of the plant.

Chicago

CHICAGO, Sept. 6.

CHICAGO machine tool dealers are considerably more optimistic as the result of a substantial amount of fresh inquiry and an upturn in the amount of business closed this week. While August might have been considered a good summer month it was not up to either June or July and the trade had expected no better than the August pace to continue up to the time of the Steel Treaters' convention and show.

Aside from the Pullman Car & Mfg. Corporation and the Illinois Steel Co. lists, mentioned in previous issues, inquiry is widely scattered and in general is for the lighter tools. The Rock Island is in the market for a wheel turning lathe and the Santa Fe bought a 20-in. x 10-ft. lathe. Used tools are in greater demand, interest being shown particularly in millers and crank shapers, both of which are hard to find.

The International Steel & Iron Co., 3936 South Lincoln Street, Chicago, has awarded a general contract without competition to G. A. Arquette & Co., North La Salle Street, for a one-story and basement works, 175 x 325 ft., to cost approximately $200,000. S. Scott Joy, 2001 Pershing Road, is architect.

The Town Council, Sibley, Iowa, will soon take bids for a 400-hp. generator and auxiliary equipment. R. D. Stewart is clerk.

Z. Erol Smith, 343 East Garfield Boulevard, Chicago, architect, has plans for a two-story and basement automobile service, repair and garage building, 75 x 120 ft., to cost $165,000 with equipment.

The Standard Oil Co., 910 South Michigan Avenue, Chicago, is completing plans for a one-story storage and distributing plant to cost about $150,000 with equipment. William Gauger, 33 West Randolph Street, is architect.

N. J. Wilkins, Ortonville, Minn., city clerk, is asking bids until Sept. 20, for an elevated steel water tank.

A. S. Alschuler, 28 East Jackson Boulevard, Chicago, architect, has awarded a general contract to the Great Lakes Construction Co., 304 South Wabash Avenue, for a three-story and basement automobile service, repair and garage building to cost approximately $650,000 with equipment.

The Chuse Engine Co., Mattoon, Ill., is having plans drawn for a one-story factory addition. George Chuse is general manager.

The Monarch Mfg. Co., Council Bluffs, Iowa, manufacturer of oil products, is considering rebuilding that portion of its plant destroyed by fire July 29, with loss reported in excess of $450,000 including equipment.

The Public Service Co. of Northern Illinois, 72 West Adams street, Chicago, has taken out a permit for the superstructure of the new Waukegan plant on the north flats of that city. The addition will cost $1,500,000.

Indiana

INDIANAPOLIS, Sept. 6.

CONTRACT has been let by the Hercules Corporation, Evansville, Ind., manufacturer of electric refrigerating equipment, to the M. J. Hoffman Construction Co., for a one-story addition, 120 x 280 ft., to cost $85,000 with equipment.

The Fort Wayne Tank & Pump Co., Fort Wayne, Ind., has plans for a two-story addition, 60 x 85 ft., to cost approximately $45,000 with equipment. C. R. Weatherhogg, 250 West Wayne Street, is architect. B. F. Geyer is general manager.

The General Piston Ring Co., Tipton, Ind., will soon ask bids for a one-story addition, 30 x 150 ft., to cost about $25,000. Lewis J. Richards, Bates Block, is architect.

The Auburn Automobile Co., Auburn, Ind., is arranging an expansion program for the manufacture of a line of six-cylinder cars and for taxicab production. Work is now under way on an addition to cost about $50,000 and other extensions will be carried out. The company is said to be negotiating for the purchase of the entire plant of the Lexington Motor Co., Connersville, Ind., now in receivership, with intention of establishing a branch plant here.

The Stedman Foundry Co., Aurora, Ind., has awarded a general contract to the Austin Co., for a one-story addition to cost approximately $36,000. The company specializes in the production of gray iron and semi-steel castings.

The Slagle Radio Co., Fort Wayne, Ind., which has been in business for a number of years, has recently been incorporated and has taken in new capital which will be used for an increased manufacturing program.

Pacific Coast

SAN FRANCISCO, Sept. 1.

THE United Lighting Standard Corporation, Compton, Cal., recently organized, is establishing a plant for the manufacture of steel, cast iron and concrete lighting standards. E. J. Adams, Compton, is vice-president, and Harold Kemp, Long Beach, Cal., secretary and treasurer.

The Santa Fe Railway Co., Los Angeles, has completed

plans for a new one-story steam-operated power house at Bakersfield, Cal., to cost about $65,000 with equipment.

The Inland Empire Paper Co., Milwood, Wash., has approved plans for expansion, including additional machinery in the digester division, in the grinding department for the production of pulp, and in the power plant. The work is expected to cost about $350,000.

The Yosemite Portland Cement Co., Fresno, Cal., headed by A. Emory Wishon, an official of the San Joaquin Light & Power Corporation, Fresno, has arranged for an increase in capital from $3,000,000 to $3,500,000, the fund to be used in connection with a projected cement mill in this section.

Fire, Aug. 27, destroyed a portion of the plant of the Diamond Drill Co., Coeur D' Alene, Idaho, with loss reported at $25,000 including equipment. It is planned to rebuild.

The Pacific Coast Paper Mills Co., Bellingham, Wash., has approved plans for a new two-story mill, 50 x 250 ft., with smaller units, estimated to cost $180,000 with equipment.

The Emeryville Union High School District, Emeryville, Cal., will build a vocational shop at its proposed new high school group to cost $200,000, for which plans will be drawn by W. H. Weeks, 369 Pine Street, San Francisco, architect.

The Portland Furniture Mfg. Co., Macadam Road, Portland, has plans for a three-story L-shaped addition, 100 x 145 x 185 ft., to cost about $50,000 exclusive of machinery. Jacobberger & Smith, Railway Exchange Building, are architects.

The McBryde Lubricating Service, 916 South Hope Street, Los Angeles, has awarded a general contract to the E. E. Etherton Co., W. M. Garland Building, for a new one-story plant, totaling about 10,000 sq. ft. of floor space. Morgan, Walls & Clements, Van Nuys Building, are architects.

The Enwood Sand & Gravel Co., Wells Fargo Bank Building, San Francisco, is planning the construction of a new plant in the eastern portion of Roseville, Cal., to cost about $100,000 with steam shovels, conveying, loading and other machinery. The company is now operating a plant in this district.

The Denby Motor Truck Co., of California, has recently completed the erection of a plant at 4371 East Forty-ninth Street, Los Angeles, and is manufacturing motor trucks. The company, which is affiliated with the Detroit company of similar name, will do its buying through the Los Angeles office.

Milwaukee

MILWAUKEE, Sept. 6.

PURCHASES of machine tools by the automotive industries have become more active, although buying continues to be limited to a few large factors rather than by the industry as a whole. Action on inquiries put out during the last half of August is satisfactory, and local tool builders are keeping new bookings fully even with deliveries. Some scattering railroad business is reported, but this consists entirely of single items. General industrial buying is increasing with the expansion of many diversified lines. The outlook is considered relatively excellent and some regard it as better than a year ago at this period.

The Wisconsin Parts Co., 571 High Street, Oshkosh, Wis., manufacturer of axles and other automotive parts and materials, has let the general contract to the Ben Gauthier Co., 117 Main Street, local, for a one-story addition, 52 x 100 ft., costing about $40,000 with equipment now being purchased. W. F. Rockwell is president and general manager.

The West Bend Aluminum Co., West Bend, Wis., manufacturer of cooking utensils and other aluminum products, will spend about $100,000 in enlarging its capacity. The general contract has been let to the William F. Tubesing Co., 373 Broadway, Milwaukee, for a factory addition, 96 x 192 ft., part three and two stories, and minor extensions. The work is designed and under the supervision of the Federal Engineering Co., 440 Milwaukee Street, Milwaukee. B. C. Ziegler is president and general manager of the West Bend company.

The White Truck Distributors, 871 Kinnickinnic Avenue, Milwaukee, Wisconsin, representative of White motor trucks, has acquired a site of 170 x 200 ft. on Clybourn Street, for a proposed new headquarters and service building, to cost $200,000 with equipment. No definite date has been set for the commencement of the work, although it is to be undertaken before the end of this year.

The Koehler Co., Kohler, Wis., manufacturer of bathtubs, lavatories and other ware, has let the general contract to Theodore Stark & Co., 130 Muskego Avenue, Milwaukee, for the construction of a new pottery plant costing about $600,000. It will be 328 x 340 ft., one-story, and 132 x 600 ft., three-stories. The structural steel, amounting to 925 tons, has been let to the Worden-Allen Co., Milwaukee.

The Board of Education, Fort Atkinson, Wis., is considering the low bid of Otto Hackbarth, local contractor, for the general work on the proposed new $200,000 junior high and vocational training school. The architects are Parkinson & Dockendorff, LaCrosse, Wis. J. F. Schreiner is secretary of the board.

Canada

TORONTO, Sept. 6.

A BETTER demand for machine tools was noted the past week and, inquiries are appearing for a number of tools on new works account. Exhibits at the Canadian National Exhibition now being held in this city have already resulted in increased sales and considerable interest is being shown in new lines of machines on display. A steady demand for tools in units of two or three is coming from the automotive industry. Some single tool orders have also been placed by the railroads.

According to M. R. Benson, division master mechanic of the Michigan Central Railway, improvements, involving the installation of new equipment, will be made to the engine shops at Windsor, Ont., at a cost of $200,000.

The city of Port Arthur, Ont., is considering extensions to the waterworks plant to cost $1,000,000, to take care of industrial expansion. James, Proctor & Redfern, consulting engineers, Toronto, have been retained to prepare a report.

The Massey-Harris Co., King Street West, Toronto, will remove its knife shop from Toronto to Brantford, Ont., and will build a new plant, 50 x 150 ft., at the latter city.

A financial offering will be made soon to provide capital for the construction of the newsprint mill for the St. Ann Paper Co., formerly the St. Anne Power & Paper Co. The company has let contracts for the construction of the mill, and two newsprint machines are being built by the Dominion Engineering Works, Ltd., Montreal. The mill will be erected a short distance from Quebec, and is expected to be completed within a year.

George Leach, superintendent of the plant of the Imperial Oil Co., Regina, Sask., states that additions and new equipment costing $500,000 will be made to the works this year.

Foreign

The Ogura Oil Co., Yokohama, Japan, will install additional equipment at its local refinery for considerable increase in output. The company has contracted with the Graver Corporation, East Chicago, Ind., for three units of the Schultz vacuum process for the production of lubricating oils, and orders for other equipment will be placed later.

Plans are under way for the construction of a new hydroelectric generating plant near Concepcion, Chile, by a company now being organized to carry out the project. A site has been secured on the Bio-Bio River, about 25 miles from the city, with initial installation to develop a capacity of 4500 hp. The project is estimated to cost close to $500,000. The American Consulate, Concepcion, John L. Steward, vice-consul, has information regarding the enterprise.

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NEW TRADE PUBLICATIONS

Air Compressors.—Sullivan Machinery Co., 122 South Michigan Avenue, Chicago. Bulletin No. 83-B of 16 pages, with many illustrations, describes the company's two types of belt-driven air compressors, running in capacity from 68 to 1472 cu. ft. per min. and designed for use in various sorts of plants.

Cylindrical Grinding Machines.—Norton Co., Worcester. Three booklets describing the company's type A cylindrical grinders. One is devoted to the 6 x 32-in. hand and power traverse machines; another to several sizes of the 10-in. machine, power traverse, hand traverse and special purpose; and the third describes and illustrates the features of the type A, 16-in. machines, both power and hand traverse.

Universal Grinding Machines.—Norton Co., Worcester. Booklet of 12 pages, describing and giving specifications of the Norton 12 x 36-in., type L, multipurpose grinding machine.

Internal Grinding Spindles.—Ex-Cell-O Tool & Mfg. Co., 1469 East Grand Boulevard, Detroit. Catalog of 20 pages. Describes the XLO internal grinding spindle and high-speed precision ball bearing for grinding spindle service. Details are given on spindles for Heald, Bryant, Landis, Rivett and other grinders and pages are devoted to the XLO air-turbine-driven spindles, one type of which operates at 65,000 r.p.m.

Rust Proofing.—Udylite Process Co., Kokomo, Ind. Booklet describing Udylite, which is a trade name covering the electrolytic application of cadmium as a rust-proofing agent. Pages are devoted to "Why Cadmium Prevents Rust," and physical, chemical and electrical properties of cadmium are given, as well as reports of salt spray and special tests.

Pumping Machinery.—Sullivan Machinery Co., 122 South Michigan Avenue, Chicago. Bulletin No. 71-I dealing with air-lift pumping methods and apparatus. Many illustrations are furnished of the company's equipment adapted to varying conditions, and also instruction for securing well data before installation of machinery.

Variable Speed Transmission.—Reeves Pulley Co., Columbus, Ind. A. C. Nielsen Co. survey of Reeves' transmissions used by the Watson-Flagg Engineering Co., Paterson, N. J., electrical contractors and manufacturers of reduction gear drives for high-speed electric motors. Data are given on the application of the transmission to warpers and other textile machinery and comparison is made between the Reeves transmission and variable-speed motors.

Railroad Tool Foremen Meet

With a registration of 112 tool foremen and supervisors, representing 52 railroads, the American Tool Foremen's Association held its fourteenth annual convention Sept. 1 to 3 at Hotel Sherman, Chicago. At last year's convention, 78 foremen and supervisors registered, and they represented 46 railroads. The exhibitors at the 1926 convention numbered 76. Officers elected for the ensuing year are as follows: President, O. D. Kinsey, Chicago, Milwaukee & St. Paul Railway; first vice-president, E. A. Greame, Delaware, Lackawanna & Western Railroad, Scranton, Pa.; second vice-president, W. R. Mullican, Missouri, Kansas & Texas Lines, Parsons, Kan.; third vice-president, H. P. Jones, Oregon Short Line, Pocatello, Idaho, and secretary-treasurer, G. G. Macina, Chicago, Milwaukee & St. Paul, Chicago. The new executive committee is as follows: J. T. Jones, New York Central Lines, Collinwood, Ohio, chairman; J. T. Sumner, Michigan Central Railroad; C. A. Shaffer, Illinois Central Railroad; W. J. Hynes, Missouri Pacific Railroad, and C. F. Harney, New York, New Haven & Hartford Railroad, Readville, Mass.

The Caldwell Foundry & Machine Co., Birmingham, Ala., has adopted a cooperative group insurance program, the total exceeding $100,000, underwritten by the Metropolitan Life Insurance Co. Premiums are paid by employer and employees jointly. Each employee receives $1,000 life insurance and will be paid $10 a week (up to 13 weeks) in case of sickness from any cause, or injury received while off the job.

THE LAST WORD

(Contributed by the Reader Service Department of the Iron Age Publishing Co.)

IMAGINE the mental tumult of the Federal Trade Commissioner who reads this on page 609 of last week's IRON AGE:

> GERMAN GOVERNMENT FOSTERS CARTELS
> ". . . these cartels (trade syndicates) . . . are quite frankly designed to restrain trade and to limit competition at home and abroad."

And not only that, *they also fix prices.* The government not only lets them do it, but actually encourages them.

Maybe chromium-plating will make golf clubs non-tarnishable. But what we see a crying need for is a paint that will make golf balls non-toppable.

Paying an average of $10.13 per suggestion, the General Electric Co. expended $22,000 during the first half of this year in prize money for 2172 suggestions from employees.

In our far from humble opinion this investment will bring an exceptionally high return. GE is wealthy and well-managed. Is there any concern, small or large, sufficiently wealthy not to encourage ideas for the betterment of the company?

The Interstate Commerce Commission calculates that the freight movement of nearly 414 billion ton-miles during 1925 by the Class I railroads is equal to hauling an average carload around the earth 482,200 times.

Our statistical prodigy has figured when the mythical freight car would reach its destination, at the speed of 25 miles per hour. Without making time allowance for changing flat wheels, switching, ejecting tramps, etc., it would arrive in exactly 55,046 years, provided the rails held out.

Was it Leif Ericson, Mr. Dooley, or Christopher Columbus, who made that famous remark about the man who sold the United States short?

Despite this solemn warning, calamity howlers are always searching for moth holes in the fabric of our national prosperity. But they have proved to be poor guessers, these viewers with alarm. As instance: *We could never have prosperity with a disgruntled farm population.* Strike one! *Within five years after the end of the World War, labor would have to accept a sharp cut in wages to prevent European competition from ruining us.* Strike two! *The growing use of the instalment plan of selling would just about finish us.* Strike three! Out!

We are still doing business at the old stand and the cash register tinkleth merrily.

A. H. D.